



FRIDAY, DEC. 25.

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Contributions.

The Report of the Michigan Commissioner.

LANSING, Mich., Dec. 19, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Permit me to briefly reply through your columns to editorial comments contained in vol. XVI., No. 50 of the *Railway Age* upon the financial statements in my annual report for 1891, recently given to the public.

I do not care to comment in detail upon the figures in the article further than with regard to those contained in the last paragraph. In the report for 1890, the total miles of road operated—14,722.61—(see statement No. 10, page 654) multiplied by the traffic earnings per mile of road—\$5,924.22 (same statement) gives the total traffic earnings for 1890—\$87,219,726.28. It was erroneous for the editor of the *Age* to multiply earnings per mile of road for 1890, as stated in the report for 1890, by the miles of road operated in 1889, as corrected in the text of the report for 1891, to obtain total traffic earnings for 1889.

The other criticisms in the editorial are erroneous and misleading, in that they connect the comparative statements of general revenue and disbursements with those of traffic earnings and expenses, when in fact they have no necessary relation to each other in the report.

By reference to the annual report for 1890, compiled by ex-Deputy Commissioner Ransom, it will be seen that our quotations therefrom were correctly written, and that they were in accordance with the company reports from which the statistics were compiled.

CHAS. R. WHITMAN, Commissioner of Railroads.

Car Ventilation.

NEW YORK, Dec. 19, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

This subject is always in order, and it must be. There is hardly any other matter appertaining to the comfort of the traveling public of more importance. Railroad officers give it very little attention, and each one waits for the other. Where is the officer who will sit down and carefully investigate the subject and the methods to accomplish it and then issue a mandatory order that this or that method shall be adopted and worked as intended? Everything connected with the ventilation of cars seems to be experimental and nothing decided, and this is an endless source of complaint.

There is no good reason why it should be so. The Metropolitan Opera House is perhaps the best ventilated public building in the country. The reason is that it is done by power. A powerful steam engine in the basement drives an enormous blower. The fresh air is drawn down a vertical shaft about eight feet square from the roof. The blower forces the air through a large chamber in which are literally miles of heated steam pipes. The air thus warmed is then distributed all over the building through thousands of minute apertures. There are no draughts or currents anywhere. No one knows how the ventilation is accomplished unless he goes into an investigation of it, but all are conscious of good clean air.

The same principle is applicable to a railroad car. The power necessary is provided in the train movement. Present methods, as is well known, admit air at the ends of the car and in the clear story, and cold draughts, smoke and cinders come in at times in abundance. The result is that all these openings are very apt to be closed, and then there is no ventilation. Ventilation is getting fresh air in and stale air out, and there is no reason in the world why the same theory of ventilation as just named for the Opera House is not applicable to a car. Now that steam heating is coming in, it seems decidedly the time to give attention to the subject.

* * *

Discomfort in Railroad Cars.

NEW YORK, Dec. 21, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The growth of comfort or even luxury that now surrounds us on a journey by rail is more keenly appreciated by the older travelers than by the rising generation. Our vestibuled, dining room, drawing room parlor, buffet, day and sleeping cars are models of elegance, beauty, and, but for one exception, I might add comfort. This exception is the need of a systematic regulation of the temperature. There ought not to be any insurmountable difficulty in doing this, especially on vestibuled trains. Upon trains that are not vestibuled it is difficult on account of the constant opening and shutting of the car doors. But both ordinary and vestibuled trains are subject to one disturbing element that must be abolished before perfect comfort can be secured, that is the opening of the windows.

With the system of steam heat now in operation upon almost every railroad, the cars are usually comfortably warm at starting, sufficiently so to induce the traveler to throw off his overcoat and exchange his hat for a light traveling cap and settle himself at his ease; but he is rudely disturbed at the first stopping place by the advent of the fresh air fiend, who gets the window opened and there is a blast of cold air that means torture to sensitive nerves, followed probably by even more serious consequences. Car windows are so constructed that all the discomforts of an open window are transferred from the transgressor to those who unfortunately sit behind, and with the exception of the idea that the window is open very little effect, beneficial or otherwise, is felt by the fiend who has caused the offense. Is there nothing that can be done to stop this fruitful source of danger to the public health?

The true remedy is to introduce a perfect system of ventilation and to abolish the car window as an operative device; at least the power to open it ought not to be in the hands of every country bumpkin or sensitive girl who chooses to think the car too hot or too "stuffy." Before the introduction of the steamboat-roof on railroad cars the necessity for ventilation was felt much more decidedly than it is now. It is oftener the excessive heat is the source of the demand for an open window now, and until the steam heating companies accomplish automatic regulation, we shall be called upon to endure the excessive heat and alternate chilling process that invariably follows.

The only movable thing about a car window should be the sun blind, while the ventilation should be under the control of the authorities. A case in point directly applicable came under notice in a recent trip. At first the cars were comfortable, but the approach of a cold wave was rapidly lowering the temperature, there was a chilling sensation down the back of the neck which became more and more persistent and unpleasant; search for the cause was instituted and three ventilators on each side of the end of the car were discovered to be open. As the seat I occupied was near the end of the car a request was made to have them closed, the brakeman said it could not be done without the consent of the conductor; accordingly the conductor was appealed to when he explained that his orders were direct from headquarters that it was a rule of the road to have six ventilators at each end of the car kept open.

To open the ventilators at the ends of the car—I am speaking of the ordinary passenger car—is altogether a mistake; the doors are constantly being opened and shut by either the brakeman, the conductor or the everlasting newsboy, and each time it is done a mixture of cold smoke, steam and air rushes into the car which keeps the ends of the car sufficiently cool at all times. It would have been more sensible to have opened the centre ventilators, but the whole thing is a mistake.

The thermometer will sometimes fall 15 to 20 degrees in an hour, therefore there should be discretionary power on the train to meet these contingencies. Why not invest the conductor with such power, place a thermometer in the car and let him or his brakemen under him so manipulate the regulators that the temperature of the car is maintained at say 70 degrees? This is an almost universal temperature of comfort. A notice posted in the car setting forth the annoyance an open window is to those who sit behind it would do much to stop the practice. But with these reforms inaugurated there would still remain the car door nuisance, the constant streaming in of cold air every time it is opened. The true cure for this evil is to vestibule the trains.

JAMES HOWARD.

Tail Lights and Rear Collisions.

MENLO PARK, Cal., Dec. 12, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with interest the article of "A." in the *RAILROAD GAZETTE* of Dec. 4, on the "Red Tail Lights and Rear Collisions."

In regard to the lights at switch stands his arguments are good, but in case of caboose lights something further is needed. "A." does not tell how the lights are to be changed or by whom this work will be done. He certainly would not expect the brakeman to do such work, because he has now more than past experience proves him able to do.

Instead, allow me to suggest the following: Have one permanent red light properly located on rear end of caboose; then have two other lights located on either cor-

ner of roof or other convenient place. These two lights to be alike, having first one red side, next green, next white, or red, green, red, green, these lights to be connected or fastened to a staff extending down to under side of car, here to be properly connected to the necessary machinery to make them revolve.

These lights can be made to revolve 40 times a minute, more or less, at a speed of 25 miles an hour of train. This speed would be bound to be such that the lights would not flash and the color could be easily recognized by the men on following train. Here we have no brakeman to depend on, therefore no responsibility will rest on him in that direction. It will be observed that should the train slow up notice will be given immediately to those following and they can act accordingly. It is a well known fact that on straight track an engineer cannot tell positively whether a light is 500 or 1,000 yards away from him, but should he see one permanent red light and two revolving lights there would be no mistake as to whether the train was in motion. Should the train stop there is no mistake about it, the two side lights cease to revolve.

W. B. HAMPSON.

"Treated" Steel for Locomotive Details.

The Midvale Steel Co.,

PHILADELPHIA, Dec. 18, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

We have read with much interest the article in your issue of Dec. 11, on "Oil Tempered Crank Pins," used on the Lehigh Valley Railroad, and we are very glad to see that the attention of the railroad world has been called in so practical a way to the fact that "treated steel is so much superior to untreated steel." At this time, when all of the leading railroads are straining every nerve in an endeavor to increase the speed of their motive power, the *Railroad Gazette* and its contemporaries cannot devote themselves to a higher duty than that of pointing out to their readers that increased speed means greatly increased strains upon the vital parts of the locomotives, and that no railroad company can afford to use anything but the very best materials obtainable.

In our opinion a very large percentage of the loss which railroads suffer from broken crank pins, piston rods, connecting rods and axles arises from the fact that the material that is used, while perhaps good in itself, is entirely unsuited to the particular purpose for which it is used. It does not appear to be as generally understood as it should be that a grade of steel that would be proper for crank pins would be dangerous if used for connecting rods. We speak advisedly when we say that much of the steel used for the most important parts of locomotives has been purchased without the question of proper qualification having been raised, price being the first and only consideration. For a good many years this company has been engaged in treating steel by the Midvale process, and what has been accomplished in this direction is well known to all who have made a study of the subject. The results obtained from the oil-tempered pin on the Lehigh Valley as given in your paper are very good, though in our judgment the steel after treatment is a trifle too hard for the purpose. Were we asked to give an opinion we should say that a grade of steel which when tested would give a high elastic limit, extension and contraction of area, combined with a moderately high tensile strength, would be most desirable for this purpose. Crank pins in service are bent backward and forward with every thrust of the piston rod, and unless proper care has been taken and steel selected possessing a high elastic limit there is danger of the pin being bent to such a degree as to exceed the elastic limit of the metal, in which case the steel would take a permanent set, and sooner or later the pin will break. The pin may be stretched a million times within the limit of elasticity without injury, but if once the limit is exceeded, the breaking of the pin is only a question of a short time. In the meantime it becomes a standing menace.

In January, 1890, we furnished to the Pennsylvania Railroad at Altoona, some crank pins treated by the Midvale process, the physical characteristics of which, as shown by the tests, were, before and after treatment, as follows:

Before treatment:	
Tensile strength.....	80,764 lbs. per sq. in.
Elastic limit.....	18.3 per cent.
Contraction.....	19.71 "
After treatment:	
Tensile strength.....	94,244 lbs. per sq. in.
Elastic limit.....	61.000 "
Extension.....	23.70 per cent.
Contraction.....	55.91 "

In our opinion these pins are better than those in use on the Lehigh Valley because, while the extension, and contraction of area are both higher and the elastic limit practically the same the tensile strength is considerably lower, indicating that the steel in the Pennsylvania pins was less brittle than the steel in the Lehigh Valley pins. The elastic limit in the Pennsylvania pins is 64.8 per cent. of the tensile strength, while in the Lehigh Valley pins it is only 54.5. For comparison we copy the result of the tests of the Lehigh Valley pins, after treatment, as given in your paper:

Tensile strength.....	112,640 lbs.
Elastic limit.....	61.170 "
Elongation.....	20.55 per cent.
Contraction of area.....	45.53 "

It goes without saying that material such as is described above cannot be made except by those who have had extensive experience in making high grade ma-

terial, and are experts in the treatment of the same, nor can it be made or sold at current prices. We are, however, strongly of the opinion that if such steel were commonly used in locomotives the cost of repairs would be largely reduced, and one of the causes of accidents so called would be eliminated from the list.

THE MIDVALE STEEL CO.

Rail Joints.

SEATTLE, Wash., Sept. 22, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice in the report of the Roadmasters' Convention some very remarkable statements: "That the wheels strike the end of the forward rail, and, bounding therefrom, strike the rail again some 8 or 12 in. ahead." May I ask the roadmasters if they can imagine any such action on a level joint held true and firm to place?

What was the angle bar doing at the joints that it should let the head rail fly so high as to throw the wheels clear of the track for a space of 8 or 12 in.? Would it not be more reasonable to suppose that the joint was low (a chronic condition of joints), and that the wheels of the very fast-running train actually skipped so much of the track? And do not these facts demonstrate the necessity of some device that will support the joints at a level at any time, every time, and at all times?

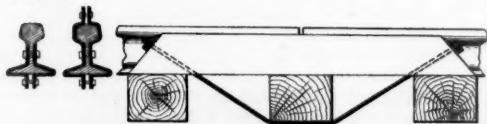


Fig. 1. Fig. 2.

Fig. 3.

A perfect joint must be as strong as the rail and no form of angle bar can be devised that will equal 40 per cent. of it. Why waste time and money on the brilliant scheme of making it stronger by making it longer?

Why not truss the joint? I am led to this conclusion by trying to deepen the angle bar thus: Fig. 1. But find three objections, namely: First, the impossibility of placing such a form of joint on a tie. Second, if made long enough to get a good grip on the rail and be of service to the rail and so be used as a suspension joint it spreads the ties so far apart that we lose the ground bearing. The third objection is that, even if possible to place it on a joint tie and extend it over each side tie thus making it a three-tie joint it would not be equal to a solid rail. The only way to make an angle bar equal to a solid rail is shown in fig. 2, manifestly an impossibility.

If we cannot deepen the angle bar on account of the ties cannot we deepen it by going under the ties or in other words truss the ties thus, fig. 3?

Complaints or unmerited praise will not make a strong joint out of a weak unmechanical device like the angle bar. Railroad men dread changes as they do fire, but I should take Barnum's advice "though three moves are equal to one fire, after you once get into the fire the oftener you move the better."

JOHN NAYLOR.

TO THE EDITOR OF THE RAILROAD GAZETTE:

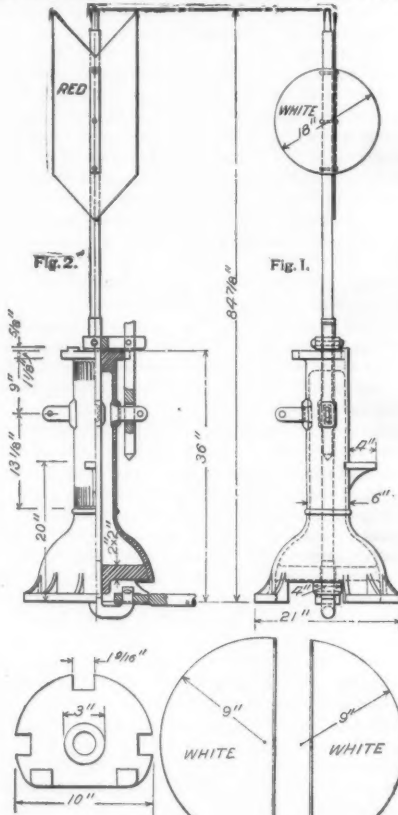
In a communication from Mr. John Naylor, of Seattle, commenting on the report of the Roadmasters' Convention regarding bad track joints and their remedy, he questions the correctness of the statement "that the wheels strike the end of the forward rail and bound to a point from eight to twelve inches ahead," saying that such a condition would be impossible at a level joint held true and firmly in place. This jump of several inches was not spoken of as occurring on a level, true joint, but with practical track such as exists on all roads, and though the wheel may not be thrown ahead by contact with the end of the forward rail, there is a decided difference in the wear of the rail at about six inches from the end, so that at any other point along its surface the depression of the end of the rail and the break in the continuity of the wave line, with all forms of joints, undoubtedly causes a slight jump of the wheel at this point, varying somewhat in amount according to the speed of the train. Although the wheel may not actually leave the rail, even at very high speeds, there is a lifting tendency which decreases the pressure on the rail for this short space. The truck weight then is renewed upon the rail and is changed from a pressure to the form of a blow. This blow is augmented by the fact that the forward rail here rises from the end in a line similar to that taken by the back rail, due, as stated above, to the breaking of the wave line. The supposition that the wheel leaves the rail would be difficult to prove and the evidence on the other side is strong, for the rail ends (for the first few inches) are constantly being worn and flattened. Though this short end may not be the worst spot on the surface it usually comes in for a place.

In further calling attention to the cause for low joints the failure to obtain but from 40 to 50 per cent. of the amount of strength of the body of the rail, for the joint, is cited as applying particularly to the present form of angle bar, and the query of "why waste time and money on the brilliant scheme of making it stronger" by making it longer seems particularly pertinent. There is but one justifiable reason for the existence of the long angle bar, which is the fact that it permits extending the bar on to the shoulder

tie, to which it may be spiked, forming a three-tie joint, thus getting the benefit of the holding power of the two shoulder ties against creeping and still placing a joint tie under the weakest portion of the rail. In order to accomplish this it is not necessary to lengthen the bar to 44 in. or 48 in., as is generally done. By spacing the three ties at the joint 16 in. centre to centre, which is quite a common practice, the necessary length of the angle bar, so as to have the spike notches properly spaced for the shoulder ties, is 37 in., and if advantage is taken of "staggering" the bars this may be reduced to 35 in. Any addition to this amount, with such a spacing of the ties, is a waste of metal, for it is yet to be proved that overlapping an angle bar beyond a shoulder tie is of benefit toward preserving the wave motion at the point where the two rails meet.

In regard to the use of six bolts instead of four, as heretofore, the benefit derived is questionable. The third bolt helps to firmly keep the bar close in to the fish of the rail, but at a point so far from the end of the rail as to be of little use, for should the two centre bolts become loose, the tightened end bolts will not prevent the spreading of the bars at the middle when a wheel passes over the joint, and a consequent working and battering of the rail ends.

Regarding the necessary sliding motion between the angle bars and rails to allow for expansion and contraction of the steel, it is well known that at times when all four bolts on an ordinary joint are tightened up on a hot day, the track may become kinked badly out of line from expansion, while the ends of the rails remain separated, kept so by the firm grip of the angle bars. This being the case it does not seem wise to add the holding power of two extra bolts. The argument is sometimes advanced that although four bolts (or two on either end of the bar) may become loose or broken, there will still



Revolving Switch Stand—Illinois Central.

be enough left to keep the joint in shape, and that it is well to add these safeguards. In answer to this, it will probably be admitted that any section foreman who would allow his track to be in such poor condition as to have two or four bolts loose at some of the joints would undoubtedly go the extra step farther, and that his case would merit heroic treatment.

Theoretically the reinforced splice is the correct principle on which to roll the angle bar. This gives the greatest strength exactly where it is most needed, and the metal is saved toward the ends, making application of the same rules that govern in the design of trusses loaded at the middle. In the manufacture of the eccentric bar there were, however, mechanical difficulties which were adverse to the general adoption of this pattern. The thickest portion of the bar was frequently out of centre several inches, thereby frustrating the original object.

A very essential feature of the angle splice is its close fit right at the end of the rail, and in a sense regardless of how loose it may be, 12 inches forward or back. To accomplish this the bolts should be spaced as closely together as may be. This will bunch all four bolts considerably, where the distances are equally divided, but the ill effects of leaving the long end of the bar free of bolts are of small moment, and the advantages gained by the use of four bunched bolts over four spread out, or six bolts, will more than compensate for any slight loss.

The reason for equal spacing is on many lines either

ignored or not seen, but where this rule is followed a large number of splices broken in two are used on side tracks and house tracks. This gives a fresh bearing surface under the head of the rail, and is, in so far, better than a badly worn bar bent down and flattened in the middle.

The cause of the breaking of splices from the top down, instead of from the bottom up, has been explained in various ways. The lifting leverage on the bar when the two side wheels of a truck are on opposite sides of the shoulder ties, combined with the fact that the top of the bar is much weaker than the flanged base, and that a bar of insufficient strength will break at its weakest point, would seem the simplest and most plausible explanation, and would be applicable to either a two or three tie joint.

The points in favor of the angle splice are such that it will long remain the favorite form of joint fastening. It can be laid during the winter when the track is frozen solid and where any moving of the ties is difficult and expensive. The joint ties are kept on the same level as the remaining ties and therefore have as much ballast below them, and the higher they are the better drainage they receive. The first point necessitates some form of angle splice in our colder climates, even though plates may be put under at the joint afterward, during warm weather.

E. W. PENFIELD.

Revolving Switch Stand.

The switch stand shown by figs. 1 and 2 is standard on the Illinois Central, and is in some ways an improvement over the standard of the Louisville & Nashville, from which the general design was taken. This stand is made at the railroad company's shops. The weight of the casting was increased by thickening up the barrel of the standard, and the working parts were somewhat enlarged. The throw of the switch points was increased to 4 3/4 inches to conform to the practice of this road, and the length of the bar made six feet for the same reason.

The fixing of the red arrow to point down is decidedly a better method than that often followed, and quite a large number of roads are adopting this style. The horizontal points are a source of considerable danger to brakemen while hanging on the sides of trains, and any means such as this for lessening the liability to accident should be taken advantage of.

The white disc, 18 ins. in diameter, is made of two parts and securely riveted a little to one side of the centre line of the arrow with the same rivets that hold the latter to the upright. The bending of the throw arm up instead of down prevents the falling off of the reach rod, this being held in place by a small cotter.

All parts are carefully made to template and are interchangeable. The stand is shipped complete, and duplicate parts are ordered from numbers cast on the different pieces. This practice of ordering from numbers is becoming more and more adhered to for supplies of all kinds as well as for rolling stock, on this road, and an elaborate system of arrangement and numbering of details on drawings is followed by the mechanical department. Car inspectors and division foremen and roadmasters are supplied with blue print books, tabulated, so that reference may be easily made to any required castings or pieces, and orders wired by using letters and figures only, thereby designating exactly what is wanted.

The Common Use of Box Cars.

BY S. H. CHURCH.

I believe it is the chief aim of a railroad to carry its freight with the best economy and expedition. The prosecution of this purpose leads to the development of all its resources, including locomotives, cars, side tracks and terminal facilities. An indispensable condition of a road having a large traffic is a free supply of freight cars. The general rule on this subject is that each road shall use its own cars in any direction, but shall return foreign cars only in the direction of home. An evil result of this rule is that it brings to the question of car supply the element of selection.

For several years in which I had control of the car supply it was my habit each day to make a hasty examination of the reports from each station showing cars on hand, and it soon became impressed on my mind that the question presented in these reports was not, How many cars have we at each station? but, How many of the cars that are at each station may we use for our business? In taking the total sum of all the cars at all the stations it was invariably found that a small proportion of these cars was available for that day's traffic, while a vastly larger per cent. of the cars was required to be loaded or hauled empty in specific directions in order to meet the rule for the return of foreign cars.

This necessity of selecting a few cars from a great many, is the hardship of every railroad in busy times, and in spite of the efforts that are made to carry the freight in cars which should properly go with the traffic, it remains true that probably one-half the correspondence between railroad officials on the subject of cars relates to their diversion.

In order to increase the measure of economy and expedition in carrying freight (as well as to remove the irritation caused by this diversion of cars), it seems necessary to abolish the present practice of selecting certain cars for certain directions, and returning others to their owners arbitrarily and against the flow of the

traffic. But if the restrictions in regard to the use of foreign cars were suddenly removed without first providing a sufficient protection, the result would be that the cars would gather at the terminal points where the bulk of the traffic would carry them; for example, in the autumn season the movement of grain eastward and the comparative light shipment of freight westward would accumulate the cars at the seaboard terminals. A piracy of cars would ensue, and the western and lateral roads not reaching the seaboard would be deprived of their equipment and get no other in its place.

But first let us establish the per diem system as a safeguard against piracy; let the amount of the per diem charge be based on a sum that will slightly exceed the amount of cost, interest and repairs of each car per day. For the purpose of getting over this point without too much delay, let it be assumed (subject to alteration) that one dollar per car per day is a fair charge, no charge to be made for the first forty-eight hours.

It is the intention of this scheme to omit stock cars and coal cars from common use, as they are especially required for the local traffic of the various roads. Likewise, for obvious reasons, refrigerator cars, furniture cars, and all equipment of a special kind, will be excluded from this discussion.

Now remove all the restrictions in the use of box cars and let us look at some of the results. At the present moment, the Chicago yards of one of the trunk lines contain probably 500 foreign cars belonging to western roads which are awaiting transfer. The owners of these cars will not permit them to move east of Chicago with the freight they now contain; but under the new plan the 500 western cars would be sent through to the seaboard, while any cars that are owned by the road east of Chicago which arrive at that point with freight for the West will be permitted to go to their final destination without transfer. Every day that the 500 western cars are held at the seaboard, the terminal road must pay one dollar (1) per car. The car service associations that are now in existence require these cars to be unloaded within 48 hours, and without the per diem arrangement the cars would doubtless be permitted to lie idle until a sufficient traffic would naturally induce their return to the West. But the per diem charge becomes a propelling power which will force the movement of the cars with any freight that can be found for them, and still they may be loaded either east, west, north or south, but they will not be kept idle on any road until they finally reach their owners, driven home by the lash of the per diem charge. The eastern cars that have been sent west of Chicago will move with equal alacrity and by a like cause. "Keep all foreign cars moving" will be the command of every railroad manager in the country; but instead of moving them in arbitrary directions with enforced empty hauls, as is now done, they will move entirely without restriction, with the volume of the traffic. The mileage charge will be abandoned and repairs will be made as now under the Master Car Builders' rules.

The objection may be advanced: "Will not roads with light equipment be soon divested of cars?" I think the reply should be the negative. All such roads have freight shipped to them as well as from them, and the cars that come to them, no matter who owns them, may be used indiscriminately. A further advantage is this: At the present time the smaller roads that run through grain belts usually call for 100 or 200 box cars before the grain is harvested and hold them 30, 60 or 90 days empty and idle. It has been thought necessary to permit them to do this, because when the greatest pressure of the crop is felt, the cars are so scarce that these smaller roads could not be supplied with enough cars to move their share of the grain.

But let us look at this under the new plan. Take a typical road to illustrate this point. It has been known to hold 300 cars three months, but now, when its order for cars comes in, it will not be filled until it is known that the freight is ready for shipment. The trunk line to which this road offers its freight will not then, of course, have 300 of its box cars idle for that road, but it will take the first 300 box cars that are unloaded at any of its contiguous terminals, no matter who owns the cars, and send them to the shipping road in daily quantities to accord with their facilities to load promptly. There will be no delay of three months now, but every resource of the most active management will be exercised to have the cars loaded and moved from that road so as to reduce the per diem charge to its lowest possible amount.

The advantages of common use may be summed up in three points:

First. Every box car on the road would be considered available for the traffic in any direction. This would reduce empty mileage and car tracing, and avoid complaint against misloading.

Second. It would lead to so much greater expedition in the movement of cars, that there could be a large increase in the volume of freight throughout the country without any increase of the equipment.

Third. Cars would never lie idle except on the tracks of the owners, because the per diem would inevitably keep them moving in one direction or other from the time they left home until their return. There would be no practical object in having them return home, however, as the principles of common use would always provide substitute cars.

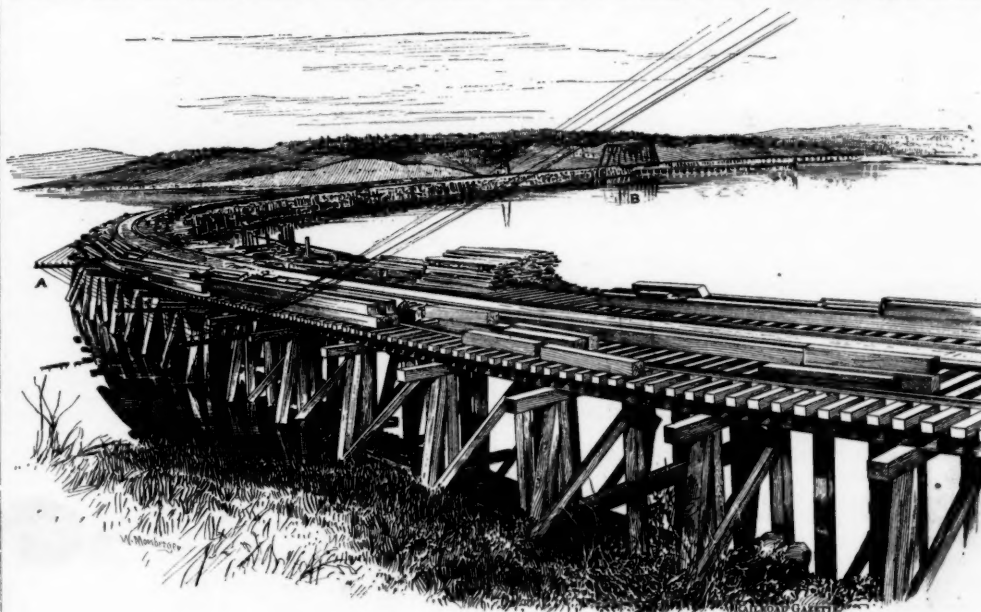
DEC. 10, 1891.

Deep Water Pile Bridge.

The accompanying illustration, reproduced from a photograph, shows the pile bridge lately constructed across the "Narrows" of Halifax Harbor, N. S. On Sept. 7, 1,100 feet of the wooden trestle, built in 1884, was carried away by a hurricane and high tide (from A to B in the illustration). A brief account of this accident, with illustrations of the structure, was given in our issue of Oct. 2. Preparations for rebuilding were commenced on Sept. 8; pile driving began Sept. 18 and trains crossed on Nov. 18.

At first the intention was to repair or renew the original structure in much the same way as it was originally built (see the *Railroad Gazette* of April 9, 1886, and Oct. 2, 1891), but as pile driving progressed beyond the former limit of the pile bents, it was discovered that the holding ground improved, and continued to improve for such a distance into the deep water that it was finally decided to use a greater number of piles in the bents and extend the bridge in this manner entirely across the deep water.

On the Dartmouth side, next the draw, 75 piles were washed out during a storm, but a stiff frame was carried from the centre pier of the draw to serve as a start-



DEEP WATER TRESTLE—HALIFAX HARBOR.

ing point, and the piling commenced again. With two steam pile drivers, one working from each end toward the middle, the gap of 1,100 ft. was successfully closed in two months, although the work was delayed by storms for 10 days of that time.

Heavy anchors were put down at about every 150 ft. on both sides, as the work advanced; iron wire ropes, 1 in. diameter, ran from each anchor to the bridge and were hauled taut by blocks. The water is from 65 to 80 ft. deep. The bents, of 8 piles each, were spaced 12½ ft. c. to c., so that every second bent was driven through the old cribs, thus increasing the stability of the bridge to a considerable extent. As full length piles would have been expensive and difficult to transport, shorter piles of 40 to 60 ft. were used, the full length of 89 to 95 ft. being made by splicing on two pieces of 6-in. x 12-in. timber, breaking joints, and two 4-in. deals for fishing pieces, making the top of the piles 12 in. x 20 in. All joints were broken and every piece bolted at every 3 ft.

The four outer piles in each bent are battered outward to serve as braces. The bents are 25 ft. wide on top and about 50 ft. wide at the ground line. Transverse and longitudinal bracing is put on at low water mark. In the deepest water four cages made of old rails, and 10½ ft. x 5½ ft. x 3½ ft., were filled with stone and sunk about 300 ft. away from the bridge—two on each side. From each of these anchors run two 1-in. diameter iron wire ropes, fastening to four points on each side of the bridge. No pile driving was done at night, but the work of building up the piles on the shore went on day and night when necessary.

The structure is quite rigid under trains running 15 miles an hour. It is proposed to build a steel structure here in a few years.

The work was carried out under the direction of P. S. Archibald, Chief Engineer of the Intercolonial Railway, W. B. Mackenzie being Engineer in Charge at the bridge and T. C. Connor General Foreman.

The Interstate Commerce Commission and Its Work.

BY HON. AUGUSTUS SCHOONMAKER, Formerly Interstate Commerce Commissioner.

CONTINUED FROM PAGE 896.

Classification. Representations by manufacturers.—Carriers, in the classification of articles of commerce, may properly take into account their market value and the shipper's representations to the public as to their character, and the analogy they bear to other articles,

in determining the class to which they justly belong. And carriers are not required to estimate the intrinsic value of freight as distinguished from its commercial value, for purposes of classification and rates, nor to ascertain whether it is in fact inferior to the description or public representations under which it is sold, in order to give it a lower rate corresponding to its actual value. *Warner vs. N. Y. C. & H. R. R. Co.*, 4 I. C. C. Rep., 32; *Andrews Soap Co. vs. Pitts., Cin. & St. L. Ry. Co. and others*, 4 I. C. C. Rep., 41.

Other classification matters.—The proper classification of an article is to be judged relatively by the classification of other articles similar in character, quality and conditions of transportation, and a former special classification for the purpose of a preferential rate is not a fair test of the reasonableness of a present rate. *Myers vs. Penna. Co. and others*, 2 I. C. C. Rep., 573.

Promises by a carrier to give a specified classification as an inducement to locate business on the line of its road cannot bind the carrier so as to compel such classification. Uniformity and impartiality are required of a carrier in dealing with all persons, and a classification must have the same construction in favor of all customers of a road. Railroad officials who have made a classification cannot testify to their understanding of its con-

struction. The sheet must speak for itself, and must be interpreted favorably to the public. *Hurlburt vs. L. S. & M. S. Ry. Co.*, 2 I. C. C. Rep., 122. Classification of freight for transportation purposes is in terms recognized by the act to regulate commerce, and is, therefore, lawful. A classification designating different classes for carloads and for less than carloads for transportation at a lower rate in carloads than in less than carloads is lawful. The circumstances and conditions of the transportation are dissimilar both in respect to the work done and the revenue earned. Carriers must not be governed exclusively by their own interests in making their classifications, but must respect the interests of those who have occasion to employ their services. *Thurber and others vs. N. Y. C. & H. R. R. Co. and others*, 3 I. C. C. Rep., 473.

A classification of live cattle prescribing a minimum weight for a carload, and a charge by the hundred pounds in proportion to the carload rate for any excess over the minimum, is lawful, and is *prima facie* more just and reasonable than the practice it supplanted of permitting a shipper to load into a car as many cattle as he pleased at a carload rate irrespective of weight. *Leonard vs. Chic. & Alton R. R. Co.*, 3 I. C. C. Rep., 241.

When classification is used as a device to effect unjust discrimination, or as a means for violating other provisions of the statute, the Commission is required to so revise and correct the classification as to correct the abuse. *Coxe Bros. vs. Lehigh Valley R. R. Co.*, 4 I. C. C. Rep., 535; *Martin vs. Southern Pac. Co.*, 2 I. C. C. Rep., 1.

Reasonableness of rates affected by value of service to shippers.—The compensation of a carrier for transportation services cannot be so limited as to make the service unremunerative to the carrier in order that a shipper may in all cases realize a profit, or even actual cost of production. But charges for transportation should have reasonable relation to cost of production and the commercial value of the service to the producer or shipper when that can be done without injustice to the carrier. *Matter of Excessive Freight Rates*, 4 I. C. C. Rep., 48; *Dela. State Grange vs. N. Y., Phila. & Norf. R. R. Co.*, and others, 4 I. C. C. Rep., 588; *Imperial Coal Co. vs. Pitts. & L. E. R. R. Co.*, and others, 2 I. C. C. Rep., 636.

The matter of excessive freight rates was not strictly a case, in the sense of an issue between parties to the record. It was an investigation ordered by the United States Senate and a report upon the testimony taken. An order was made, deemed appropriate to the situa-

tion found to exist, reducing to some extent certain grain rates. The only principles of a permanent character apparently applied were, that the commercial value of an article of commerce, or in other words the value of transportation service to a shipper, is an element in rate making to be applied in the public interest so far as may be just to carriers; and that when carriers persistently disregard their established rates and accept lower prices their conduct is evidence that the secret rates they accept for their service are compensatory, and *prima facie* should be their open rates.

Duty as to rates when carrier is producer and shipper.—When a railroad company acting as a common carrier is also directly or indirectly an owner, producer and shipper over its own line of a commodity in the production and shipment of which others who have to use the road for transportation are competitors, it cannot adjust rates so as to inure to its own advantage in its double character as carrier and shipper, and work prejudicially to other shippers, but must carry for reasonable rates for the public generally.

A railroad company which is also a shipper cannot use its power as a carrier to impose rates for the public on an article shipped also by itself, which are unjust, oppressive or unreasonable, and the fact that the rate is nominally charged to itself as a shipper does not justify it as a public rate nor preclude its correction. *Coxe Bros. vs. Lehigh Valley R. R. Co.*, 4 I. C. C. Rep., 535; *Haddock vs. Dela., Lacka. & W. R. R. Co.*, 4 I. C. C. Rep., 236.

Undue preference by payment of car mileage and yardage for cattle.—Any methods by which an unlawful result is effected become devices for the end attained, and the condemnation of the statute falls alike upon the result and the means employed. Payment of car mileage and of a yardage charge for cattle to a firm of dealers engaged in shipping live cattle and furnishing cars for the transportation of their own cattle and the cattle of other dealers who ship to the order of the firm, but not for the public generally, when large pecuniary advantages result to the firm from such arrangements, over other shippers, is an unlawful preference to the firm that furnishes the cars, and an unjust prejudice to other shippers who are competitors. *Shamberg vs. Dela., Lacka. & W. R. R. Co. and others*, 4 I. C. C. Rep., 630.

Combination rates.—A combination rate, so called, made by the addition to a through rate, to a basing point, of a local rate to a point beyond, or back to an intermediate point, is unjust and unlawful, because it enables some shippers to get advantages over others and is not a public showing of a straight rate to the point of destination. *Martin vs. Southern Pac. Co.*, 2 I. C. C. Rep., 1; *Lehman, Higginson & Co. vs. Southern Pac. Co. and others*, 4 I. C. C. Rep., 27; *Hamilton & Brown vs. Rome & Col. R. R. Co. and others*, 4 I. C. C. Rep., 687.

Limitations on right to make less charge for longer distance.—The circumstances and conditions which make a greater charge for a shorter distance over the same line and in the same direction lawful, relate to the nature and character of the transportation service rendered by the carrier to the longer and shorter distance points. Water competition, to justify a greater charge for a shorter distance, must be competitive in transportation to the longer distance point in respect to traffic which would reach the destination by water transportation if not carried by the railroad line. *James & Mayer Buggy Co. vs. Cin., N. O. & Tex. Pac. R. R. Co. and others*, 4 I. C. C. Rep., 744.

This case applies a limitation on the nature and effect of water competition to justify an exception to the rule of the fourth section, which is stricter than any preceding case. Under this construction an exceptional rate can only be made for freight which can be taken by either a railroad or water carrier from the same point of shipment. The question may have to be further considered before it can be deemed finally settled.

Interchanges and discriminations under the second clause of the third section.—Cases under the second clause of the third section, requiring reasonable, proper and equal interchanges between connecting roads, and forbidding discriminations in rates and charges in such interchanges, have frequently arisen. The construction of the section has been perplexing, and its apparent meaning has been gradually developed. The first case was that of the *Kentucky & Indiana Bridge Co. vs. Louisville & Nashville R. R. Co.*, 2 I. C. C. Rep., 182. The case involved several different questions, but the Commission ruled that the duty to interchange was absolute at the point of intersection. This was ruled otherwise in the United States Circuit Court to which the case was afterward taken.

The case of *Little Rock & Memphis R. R. Co. vs. East Tenn., Va. & Ga. R. R. Co.*, 3 I. C. C. Rep., 1, was peculiar. The East Tennessee road has two connections at Memphis, the Little Rock road and a nearly parallel branch of the Iron Mountain road connecting with the main line, near Little Rock. The Little Rock road desired traffic over its line from Memphis to points on the Iron Mountain road beyond Little Rock, and demanded interchanges with the East Tennessee road for that purpose. The opinion of the Commission was an argument in favor of the interchange claimed, on the ground that that was the apparent intention of the statute, but the application was denied because the Commission thought

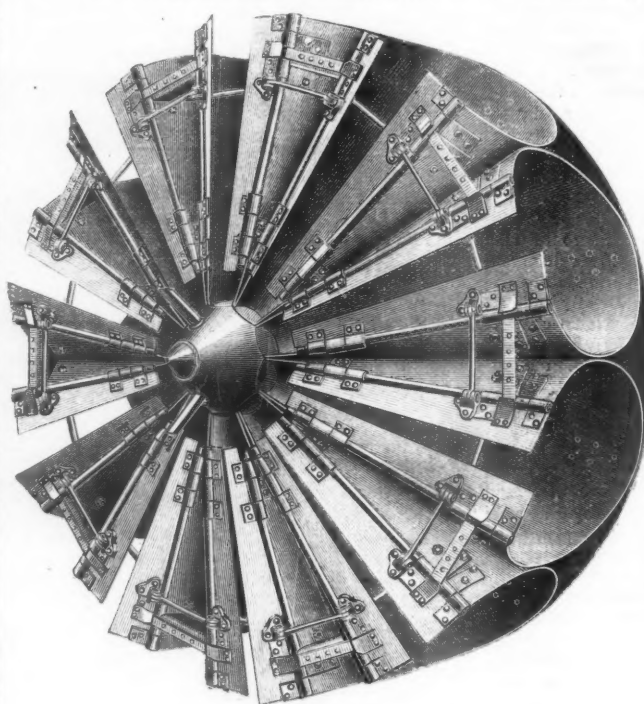
the act had omitted to confer power to enforce a through rate and equal interchanges in such a case.

The cases of *Mattingly vs. Penna. Co.*, 3 I. C. C. Rep., 592, and *Lehman, Higginson & Co. vs. Southern Pac. Co.*, 4 I. C. C. Rep., 1, followed the Little Rock case on the point of enforcing a through rate, and involved no question of discrimination between connecting lines.

The case of *Capehart and others vs. Louisville & Nashville R. R. Co.*, 4 I. C. C. Rep., 265, was put on the ground that the interchange was demanded by a water carrier not subject to the Act, and which therefore could not claim the benefit of its provisions.

The case of *N. Y. & Northern Ry. Co. vs. N. Y. & New Eng. R. R. Co.*, 4 I. C. C. Rep., 702, squarely presented the question of two connecting roads with a third road, both having suitable facilities for interchange, and both reaching a common destination. The Commission ordered the interchanges to be made with the petitioning road. This decision probably gives effect to the true meaning of the statute, and is important and far reaching in its consequences. The opinion, in discussing the law, states that the statute imposes an affirmative duty to interchange, and a negative requirement not to discriminate in rates and charges between connecting lines in such interchanges, and on these provisions the ruling is based.

Most of the leading principles established by the Com-



The New Wheel of the Rotary Steam Snow Shovel.

mission have now been referred to, in this and a preceding paper. Others of less importance, perhaps, have also been declared and applied, and some cases have involved an application of two or more rules of the statute.

Pooling.—The section of the statute under which there has been no adjudication is the fifth, prohibiting pooling—certainly one of the most important in the Act. This section was incorporated in the Act against strong opposition, and with doubt of its usefulness. It is now apparent that it would have been better to bring pooling arrangements under the law, subject to the supervision of the Commission, and with proper safeguards against abuse, than to prohibit them altogether. The only argument against pooling, of any force, is the possibility of agreed rates being too high, or extortion as it is styled. But this is not possible under the requirement that all rates must be reasonable and just and with the authority of the Commission to pass on the reasonableness of rates. The alternative of pooling is competition, which was thought to be a public benefit. But unregulated competition has been demonstrated not to be a benefit to the public, but to be injurious alike to the public and the roads, and, as has been said, "is the foe of regulation." It is the prolific source of nearly all the unjust discriminations and other bad practices that the statute was intended to prevent, and of the demoralizations in prices of articles of commerce that so seriously affect trade. Pooling was only a plan of competing roads, in the absence of law on the subject, to regulate destructive competition, and thereby maintain uniformity and steadiness of rates. The law should avail itself of this co-operation of the roads in some suitable and properly guarded form, as the best and perhaps only wholly efficient mode by which its provisions against unjust discriminations in the various ways in which they are practiced can be substantially checked.

Hydraulic Forging.

Prof. Coleman Sellers, E. D., has lately delivered a valuable course of lectures in the Department of Engineering Practice of the Stevens Institute. A recent one relates to steam hammers and hydraulic forging and

riveting. This lecture is worthy of the attention of every one who has anything to do with forming wrought iron and steel by power. The lecture is too long to be reproduced here; it is given in full in the *Stevens Indicator* for October. Among the other useful memoranda given by Prof. Sellers in this lecture are the following:

From these experiments we concluded that a press capable of exerting from 3,000 to 4,000 lbs. pressure per square inch of surface acted upon, is quite sufficient to deform hot steel when the mass is free to expand sideways. Four thousand pounds per square inch is not enough, however, to cause hot steel to flow in a closed mold and to fill all corners. To determine the pressure required to do this kind of work, a cylinder was prepared having two plungers, one entering from each end. In this cylinder, between the two plungers, a hot bar of square iron was placed and a given load applied, amounting to 3,000 lbs. to each square inch of the plunger end. This caused the metal to flow and to partly fill the cylinder. The piece was reheated, and again acted on, while a new square billet was also tried; in both cases the load being increased by 1,000 lbs., and the effect noted. A satisfactory filling of the mold was not accomplished until a pressure of 15,000 lbs. per square inch was reached; and from this up to 20,000 lbs. per square inch was required in some cases to fill the sharp corners. I am satisfied that a compressing machine to act in closed dies must be calculated on a power of 20,000 lbs. to the square inch on the metal; and this holds also with power riveting machines, where the head is confined by the cupping die and the rivet is to fill all inequalities in the holes that may not quite coincide.

The actual power required to forge by press is about one-third of that required to do the same amount of deformation by hammer, while at the same time, and what is of far more importance, the penetrative effect is very much greater in the press than in the case of the heaviest hammer as compared to the bulk, and far greater still than the penetrative effect of light hammer of high fall on large masses.

In regard to use of power for riveting steam boilers and similar work it may be well for you to note with considerable care the experience that has been gained in process of perfecting the machinery for this purpose. The early riveting machines were what were called 'bull' machines, in which the riveting power was levers or toggle joints. The objection to this form of machine was that there was no allowance made for an excess of metal in the rivet or for too little metal in it, so that some of the rivets received too great a pressure if they were put in of extra length, while shorter ones did not receive sufficient pressure to cause them to fill up the holes properly. It was also found that the excessive pressure caused by this mechanical riveter had the effect of stretching the seams so that the cylindrical boilers riveted in the circumferential seams were considerably larger in diameter at the joint after riveting than before, and this stretching weakened the joint at that point. One very lamentable explosion that occurred some years ago was ascribed to the riveted joint due to this excessive pressure.

The relative advantage or disadvantage of hydraulic riveting as compared to direct acting steam riveters has not yet been settled to the satisfaction of everybody. Makers of both kinds of machines found that a blow was not advantageous in closing the rivets by machinery, not that any harm was done to the rivet itself or to the boiler operated upon, but a very serious difficulty arose to the machines themselves. Steam riveting machines having a large steam pipe leading to the direct acting cylinder capable of giving a heavy blow are liable to break, and no matter how the frame is made in regard to form or strength, their durability was very limited, and many costly experiments had to be tried to get over this difficulty of the breaking of the frame of the machine.

I can report having seen some recently constructed in which the throat of the riveting machine or the overhang was 17 ft., permitting a length of boiler of 17 ft. to be riveted continuously at one operation. It will, in fact, permit double that length, for a plain cylinder boiler can be riveted for 17 ft. of length, and then turned over and the other end riveted separately, but the design of these deep-throated riveting machines was to permit the riveting up of the waists of locomotive boilers and the attachment of the waist to the fire box, as there would be no requirement in plain cylindrical work for such a long line of rivets being driven at once.

It may be interesting for you to know that during my recent visit to England I found that prejudice against the power riveting machines still obtained in that country with even more force than it has until recently in America, and the best work has been advertised as that being done by hand, while in this country the great feeling is in favor of power riveting, as instanced by such establishments as the Baldwin Locomotive Works, the Pennsylvania Railroad and other large users of riveting machinery.

Improvements in the Rotary Snow Plow.

We show herewith a new wheel of the Rotary Steam Snow Shovel, which is modified somewhat from our description of it as brought out last year. The arrangement of the cones is essentially the same as last year, which was found to be of decided advantage, in that the wheel frees itself from snow more readily than in the old design. The adjustment of the knives has been so made that they will not cut off more snow in one revolution than the wheel can take care of. The hood or front of the wheel casing has been modified by changing the bell mouth to a straight cutting edge and allowing the wheel to come in contact with the snow before the edge of the hood. This, however, applies, we believe, only to the central part of the wheel; at

its circumference it is still drawn back somewhat from the edge of the hood.

The flanger and ice cutter have been modified to reduce the danger of breaking them. The ice cutter is held by a shearing bolt, which will be broken in case the cutter strikes an obstruction and allow it to swing back sufficiently to pass. Other parts which come below the top of the rail are secured by bolts designed to be broken in case obstructions are met. The mode of operating the ice cutter and flanger has been improved by connecting them by iron rods to cranks on a balanced shaft, by which they are raised and lowered simultaneously by the action of an air cylinder, which is supplied with pressure from the main reservoir. These are operated by the pilot by means of levers in the pilot house.

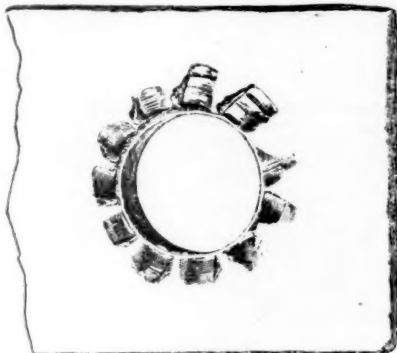
The arch bars of the trucks have been strengthened, spring seats added on the transoms, and all main bolts supplied with double nuts and split keys. The main frame has been strengthened, steel I-beams having been substituted for iron, and wrought iron transoms for cast iron. The new bed plate is a decided improvement. It is heavily ribbed throughout and now has great strength. The main gear has been moved back to the rear of the front centre bearing, permitting the main shaft to be lengthened, thus carrying back an additional part of the weight of the machinery and getting better distribution of the weight. The gear wheels are made of gun metal and are believed to be of ample strength. A new boiler has been adopted, with great heating surface and steam capacity.

The rotary is equipped with the Westinghouse air brake with an extra large main reservoir, and with the air whistle signal. Considerable attention has been paid to the comfort of the men. The roof of the cab has been raised, giving more headroom, and the pilot house and engineer's cab are provided with seats. Nine of the new machines will be in operation this winter on Western and Northwestern roads, and others have been ordered for the State railroads of Germany and Russia.

The Resilient Ratchet Faced Washer.

The nut lock which is illustrated is one recently patented and which is made by the American Washer & Manufacturing Co., of Newark, N. J. It is known also as the Harvey ribbed nut lock, and was shown at the last convention of the Roadmasters' Association of America.

This nut lock is made from oil tempered steel and it is claimed that its quality is unexcelled for the purpose. The chief peculiarity, however, is in the cutting ribs on



both sides of the washer. When the nut is set down these ribs cut into the fishplate and the nut and, it is claimed, hold the nut so that it can only be removed by a wrench and considerable force. The grooves made in the surface of the fish plate and the nut are shown in the sketches, which are drawn from actual examples. This washer thus becomes a positive lock and is being largely sold. The company invites orders for trial lots. The washers made by it before this latest improvement have had very extensive use and are well-known.

Shop Notes in the Northwest.

At the Como shops of the Northern Pacific, near St. Paul, there are now employed something more than 400 men. In addition to the usual repair work, missing numbers in both passenger and freight departments are being filled, and some of the older coaches are being remodeled when in need of a thorough overhauling. A Pullman sleeper, the "Dickinson," has just been rebuilt. A number of baggage and combined mail and express cars have recently been built, and two are now in course of construction. The coaches which are remodeled receive modern improvements. They are better lighted and ventilated, have improved seats, and, as fast as the stoves burn out, they are replaced by fireproof Baker heaters. Several sleepers which run between Chicago

and the Pacific coast have been equipped, in addition to lamps, with electric lighting apparatus. These cars are run in connection with the limited electric lighted trains of the C., M. & St. P., between Chicago and St. Paul.

It is the practice here to use in car construction, steel and malleable iron, wherever it is practicable, in place of grey iron. The running gear of cars is being gradually strengthened, larger journals are used and the cars are being built throughout with a greater reserve of strength to meet the requirements in service occasioned by ever increasing loads as well as the continual lengthening of trains. All cars, without regard to length or capacity, passing through the shops are equipped with air brakes. Iron roofs are applied to all box cars, as are also Dunham doors and McGuire grain doors.

One-half of the freight erecting shop is now used for passenger work; and it is understood that the capacity of the shop will be largely increased next year. This improvement would include the erection of a car and paint shop; the enlarging of the machine shop and the construction of a transfer table, so located that it would serve the contemplated shop, as well as the present car and paint shops. Mr. J. C. Barber, master car builder of the road, has his headquarters at these shops as has also Mr. O. H. Reynolds, mechanical engineer of the road.

The "Soo" (M., St. P. & S. Ste. M.) shops in Northeast Minneapolis are busier than ever before, and in order to work nine hours per day the men are only allowed 15 minutes at noon. A full crew of men is employed in the various departments—the locomotive and car work are both done here. In the machine shop are eight engines, three of which are scheduled to be finished this month. An ingenious device has been invented by J. H. Hickman, the shop foreman, for showing the variation in wear of driving wheel tires. It consists of a milled wheel revolving on the tread of the tire and showing the variations upon a dial in 1-100 parts of an inch. The periphery of the tire is divided into 36 equal sections; the extreme variation in each section is recorded, and the record is filed for reference. When driving wheels are put into the lathe to be turned, the journals of the driving axles are covered with a thin coating of white lead and oil. In case there is a fracture, the jar of the tool will cause the oil in it to exude and discolor the coating. In this way the slightest crack can be plainly seen. The wheel lathe has been equipped with an automatic arrangement for turning the proper bevel on the outside of tread of engine truck wheels. The tool post is set at the proper angle and the work is governed by the automatic feed.

Passenger engines are well equipped for service in snow. The equipment includes a pilot plow and flanger, false bottom to ash pan, storm cover for tender and 35 ft. of steam hose to be attached to the dome for use in case of freezing. The storm covers for tenders are made of 2-in. finished pine, and have the following inside dimensions: length 13 ft. 3 in., width 4 ft. 6 in., height 2 ft. 6 in. These boxes are 4 in. higher in the centre than at the sides, and are provided with two doors on each side, opening outward. Angle irons are provided at the top for supporting doors when open and at the bottom for attaching to the tank. The cab curtain reaches over the end of the cover, and thus all snow is excluded from the coal in the tank, the fireman is protected, and sudden draughts of air in the fire box are prevented. The false bottoms are bolted to the ash pans, the exhaust from the air brake pump is carried between the two, the lower one being provided with four holes for carrying off the water of condensation. Mr. Williams says he does not know of an instance where an ash pan so equipped has been frozen up.

A very strong tender truck is being used when trucks are repaired. The bolster is particularly strong, and instead of trussing, three pieces of timber and two iron plates (the centre timber separating the plates) well bolted together are used. There has been no trouble from bolsters sagging since this pattern has been employed. Some months ago the 18 x 24-in. cylinders of one of the mogul freight engines were replaced with a pair of 19 x 24 in., as it was thought the boilers had sufficient capacity for the larger cylinders. This has been demonstrated in service, as the engine now hauls two more loads than engines of the same class, with only a slightly increased fuel consumption.

In the car shop a coach is being transformed into a combination car and coaches are being cleaned up and varnished. A Fay adjustable three-spindle boring machine has recently added to the equipment of the mill.

The Ventilation of Tunnels and Subways.

In considering underground railroads the *Railroad Gazette* alone appears to attach any importance to the question of tunnel ventilation. The other engineering journals accept without question the unwarranted assumption that ventilation will take care of itself. This has been glossed over by promotion engineers who know or ought to know better. They have talked about piston trains as effective ventilators when all the time they knew that the conditions for piston trains were not even intended to be present but that at stations there was intended to be a free communication between the two tracks and no provision for doors or "bratticing," to use a coal mining term. The fact is ventilation has been shirked because it has appeared too costly to include in the estimates.

The tunnel beneath the Mersey at Liverpool is a striking exception to the above. Extending as it does deep below the bed of the Mersey in the solid red sandstone and approached at either end by elevators of 70 and 90 feet lift, it was foreseen that ventilation was a necessity and it was grappled with in a bold manner and not in any half-hearted way. The tunnel is large enough to avoid the piston action, its cross section being several times that of the trains. At and near the middle of the tunnel are openings to a smaller side drift or tunnel running alongside of the main tunnel to the shore end, where is fixed a large fan which was built by a leading firm of colliery engineers. The result of this system of ventilation is that air constantly enters at the stations, which are thus swept clear of all foul air. A train starting in pure air at the station and follows the air traveling in the tunnel up to the centre. Any change of air between train and tunnel is thus less than it would be if the air in the tunnel were not moving. Past the tunnel centre the train begins to travel against the moving air. By that time the air in the train will be more or less fouled by the passengers and the ventilation due to train motion then begins to increase. The first air entering from the tunnel to the train is perhaps as good as that time as the air in the train. As the train proceeds it meets purer air at every foot forward, and when it reaches the station is in air of surface quality again. To whatever extent the ventilating fan is short of the power to rid the tunnel of smoke before another train comes along, the fault is minimized by the system employed and there is always a positive removal of all the air in the tunnel within a known time, depending on the fan capacity, and all used air travels to the point of removal in such a way as to least affect the air in the cars. This tunnel was ventilated as if it was a coal mine and the appliances were of a sound character.

The piston train idea of ventilation has really been simply an excuse for skimping constructing. Tunnels have been made small in order, it was claimed, that the trains should act as pistons. Could we always insure a wind blowing with train, the idea might fit the case of a tunnel open at both ends to atmosphere, but cannot conveniently be applied in practice. The trains do at most but churn the air in the London subway between the terminals, and a certain degree of interchange of air with the surface does also go on, for sometimes the stairways are filled with an uprising, strong smelling, warm or cold current air as the case may be and a rise or fall of the barometer may easily produce a two per cent. change. The fluctuation of the barometer of course produces a continual change of air, though insufficient for practical purposes; yet this is probably the main force at work in the South London subway.

As regards the presence of gas, water or other pipes in subways or in lateral galleries, there is far too little thought of the possible, I may say probable, dangers of this arrangement. The fracture of a gas pipe and the sparking of a commutator, would be inconvenient, at least, on the street above, let alone those below grade.

In comparing shallow with deep tunnels it is important to remember that the ventilation of the former is a trivial matter comparatively. By means of numerous openings to the atmosphere, not difficult to arrange, every train movement, however slight, will push out or draw in some air at some of the openings. Every movement thus effected means a change of air, for that which escapes at the street passes away at once and does not return.

In a deep tunnel the effect of movement is the same, but it can extend only as far or to the same bulk of air as in the shallow tunnel, and is insufficient to change more than a few cubic feet of air at the top of a shaft or stairway. The air in the tunnel itself remains the same, that only at the stair head is at all changed, and very slowly diffuses downward. This and the loss of time at the elevators, and the expense of these at so many points, must tell unfavorably against deep subways for city traffic, and one can hardly see how any other decision could be arrived at in respect of the New York rapid transit scheme than in favor of some shallow tunnel, if a tunnel it must be.

M. Am. Soc. C. E.

Recent Locomotive Speed Indicators.

Some recent speed indicators for locomotives form the subject of a profusely illustrated article by Carl Schlöss in the *Wochenschrift* of the Austrian Engineers and Architects' Society for Oct. 30 and Nov. 6, 1891. The article is of considerable length and reviews, in condensed form, the results achieved in the past few years by the endeavors made to turn out a really serviceable and convenient form of apparatus of the kind considered. Among the devices described are the Klose indicator, made by the well known Oerlikon Machine Works in Switzerland and stated to cost 750 francs (about \$150); the Sombart indicator, made by Buss, Sombart & Co., of Magdeburg, Germany, costing about 200 marks (about \$50); the Brüggemann indicator, made by P. Sukow & Co., of Breslau, Germany, costing 185 marks (about \$46); the "Chronotachymeter" of the Paris, Lyons & Mediterranean Railroad, of which about 400 are now in use on that road; the Haushalter indicator, made by G. Hasler, of Berne, Switzerland, at a price of 475 marks (about \$119); and the Petri indicator, made by J. Neber's Sons, of Munich, Germany, and Siemens & Halske, of Vienna, Austria.

Some of these indicators have already been described in the *Railroad Gazette*. As a means of enabling ready comparison, however, Mr. Schlöss' article will, no doubt, prove welcome to many. The illustrations are well executed and are printed on special plates. Diagrams obtained by means of some of the indicators are also shown.

English Tender—Lancashire & Yorkshire Railway.

The locomotive tender shown was devised by Mr. J. A. F. Aspinall, Chief Mechanical Engineer of the Lancashire & Yorkshire Railway, Horwich, England. The illustration shows the construction of a modern English tender. Those who saw the tender accompanying the Webb compound on the Pennsylvania road will remember how easily all parts in the interior

could be inspected. The same is true of this tender; the absence of bogie trucks clears the underside of a mass of parts difficult to examine. The extreme wheel base is but 10 ft. 6 in., and with sufficient lateral motion in the axle boxes of the centre pair of wheels there is no need of swivel trucks.

The water scoop shown was devised by Mr. Aspinall after considerable experience with other designs, and we remember his statement at Horwich that he had found this scoop to possess so many advantages that he had chosen it in preference to several other designs. This tender may be taken as representing the best English practice. The general dimensions are given in the cuts. The tank capacity is 1,800 gallons, and the coal capacity 3 tons. The empty weight is 31,360 lbs.; loaded, 58,466 lbs.

Inertia of Thermometers.

At the recent meeting of the American Society of Mechanical Engineers Mr. A. F. Nagle presented a paper reciting some "Experiments to Determine the Rate of Fall (or Rise) of a Mercurial Thermometer under Different Conditions." The following is a condensation of the paper, which cannot fail to be of interest to those who are making temperature measurements:

Tests have now been made under three conditions, not sufficient to establish a law covering any particular velocity of current, but sufficient to show conclusively that the velocity of current has altogether too great an influence to be neglected.

In the first case the thermometer was heated to 345° Fahr., and allowed to cool in the centre of a room at 74° Fahr. without any artificial circulation of air. In this case radiation and convection together reduced the temperature at a rate which gave us a constant of 10.5.

The method of obtaining and applying this constant is explained in the former paper. The mean difference between the temperature of the thermometer and the room at intervals of 10 sec., is divided by its fall during the same time.

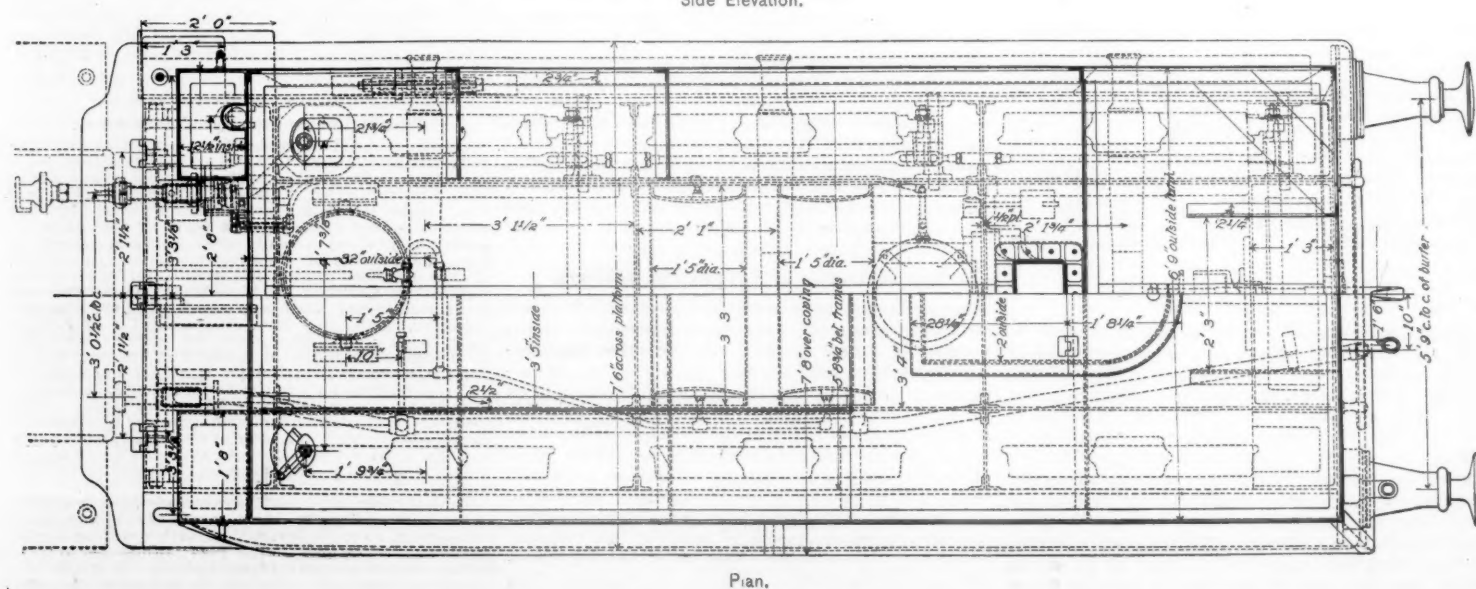
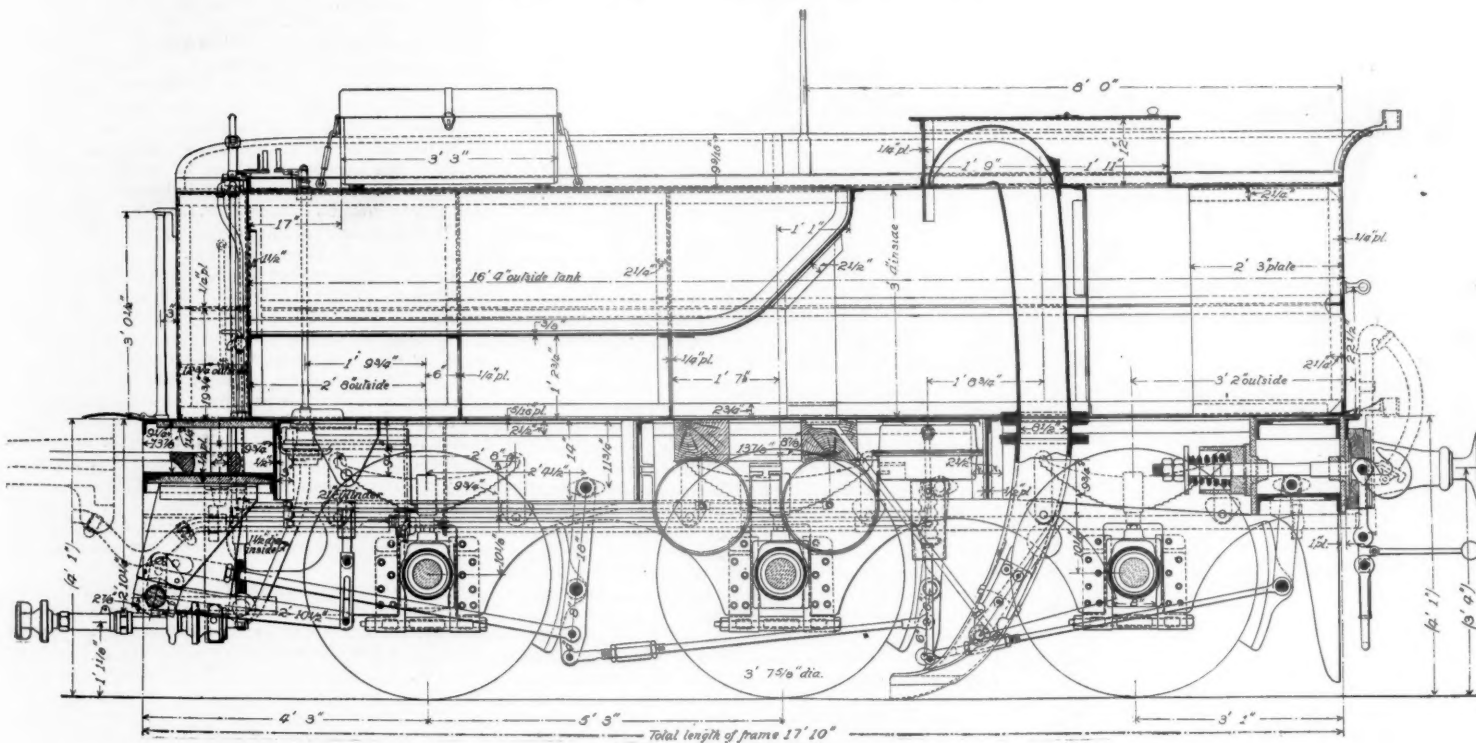
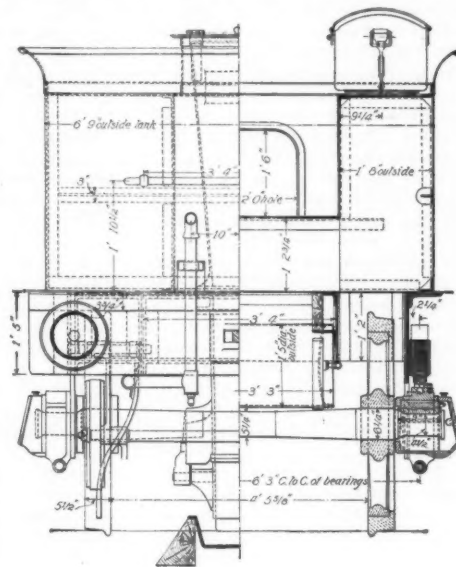
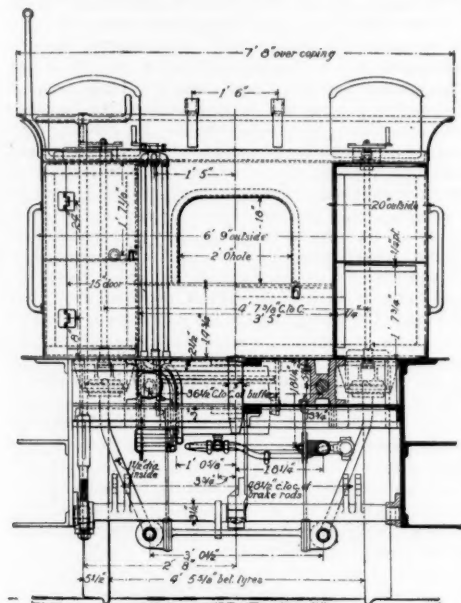
In the second test the air was fanned quite violently and gave a constant of 5.90, while with the same thermometer, designated "B" in the former paper, under like

conditions, except such difference as would naturally result from such imperfect methods of cooling, the constant was found to be 5.44.

In the third test the thermometer bulb was held in front of a $\frac{1}{4}$ -in. tube, from which issued a violent blast of air, 74° Fahr., generated by a strong foot bellows. This gave a constant of 1.80. See table and diagram, fig. 1.

In each of these cases the radiation must have been the same, and we learn that by far the greater effect was produced by the velocity with which the cold air impinged upon the heated thermometer.

We learn from these simple experiments that automatic sprinklers, or other bodies to be heated for scien-



TENDER FOR THE LANCASHIRE & YORKSHIRE RAILWAY.

tific tests of this character, are so greatly influenced by the velocity of the current of either hot or cold air, that unless full cognizance be taken of this fact the results will be of but little scientific value.

There are two methods of preparing ovens for sprinkler tests—large ovens having a fixed temperature, and small ovens with a rising temperature.

In the former case it is exceedingly difficult to maintain a fixed temperature during the operation of tests without adding (or losing) heat, and this must cause currents of more or less magnitude in different parts of the oven.

To illustrate the application of these constants: Assume the temperature to be rising at the rate of 12° in 10 seconds, and the indicated temperature at the end of that interval to be 217° , there must be added $12 \times \text{constant}$, which in this case assumes to be 8, giving 96° to be added, or a total of 313° as the actual temperature at that instant.

The following discussion was presented by Mr. D. L. Barnes.

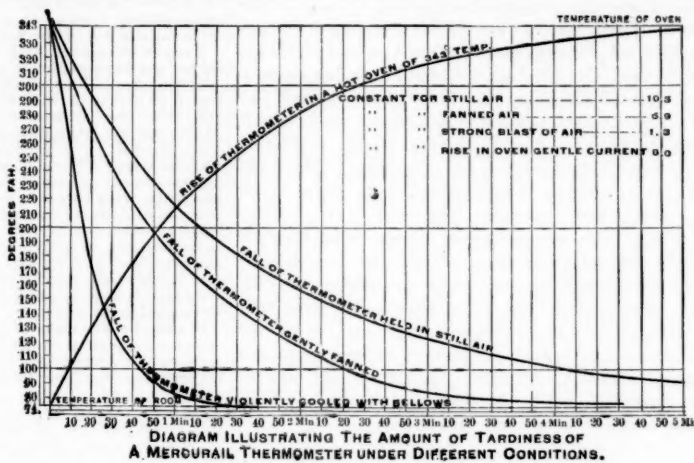
The results of Mr. Nagle's investigations regarding the accuracy of the readings of thermometers in atmospheric air which is rising in temperature, or when the thermometer itself is at a considerably higher temperature than the air, are highly interesting. He shows that the velocity of air in passing the thermometer materially affects the rapidity of fall or rise of the mercury column. This might be expected, as the thermometer is cooled by contact with the molecules of air, and the greater the velocity at which the air moves the greater the number of molecules which will come in contact with the thermometer in a given time. It would be interesting to know whether a thermometer inserted in a rapidly moving current of air would, after reaching a normal reading, register a temperature higher than the true temperature of the air.

One application of these results is found in steam calorimeters when used on locomotives. Under the conditions which there exist, the amount of moisture in the steam varies considerably within a few seconds. Within one minute from the time of starting a locomotive the rate of steam used per minute from the boiler will vary several hundred per cent., and consequently the amount of moisture entrained with the steam varies considerably. To determine the variation in wetness during this short interval, it is necessary to have a quick-acting thermometer with the bulb placed in the wire-drawn steam in the calorimeter. Evidently, the results in Mr. Nagle's paper show that the readings of a thermometer under these conditions would need to be corrected considerably before they would be true.

Another application of the results obtained by Mr. Nagle is found in steam heating. A steam radiator in a room heats the air in two ways; namely, by convection and by radiation. With indirect systems of heating, the air is heated almost solely by coming in contact with the radiator as it passes through the heating chambers. According to Mr. Nagle's results, one might expect that the heat extracted from a radiator in a given time would largely depend upon the velocity of the current, and perhaps the law of the falling temperature in a thermometer, as determined by Mr. Nagle, might apply to the extraction of heat from a steam radiator placed in a current of air; that is, the amount of heat extracted from a radiator might be inversely proportional to the constants which Mr. Nagle has determined. Perhaps there are other places where there are rapid fluctuations in temperature which would be difficult to record unless some correction was made for the inertia of the thermometer. What Mr. Nagle has done is to show us how to correct for this inertia. We may possibly learn from these results that in a room having too little steam heating surface under normal conditions, the use of a small electric fan to put the air in the room in motion would enable that small surface to heat the room more satisfactorily.

Railroads at High Altitudes.

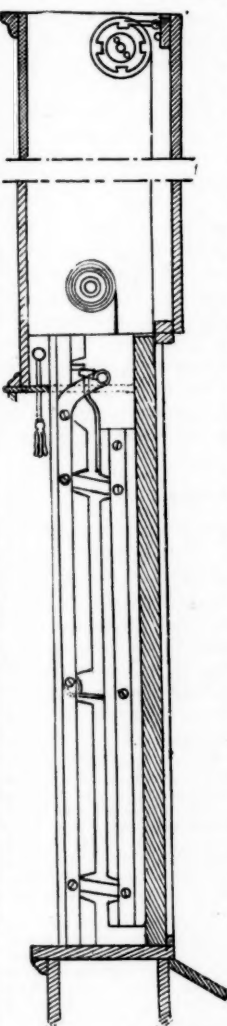
Under the above title Mr. Ch. Legrand, a French engineer, has published an account, based largely upon his experiences during a South American trip, with special reference to an expedition in the Andes. He saw more or less of several railroads reaching maximum elevations of from 3,100 to 4,800 metres (10,170 to 15,748 ft.), and recounts the difficulties of working at the high altitudes encountered owing to the rarefaction of the air and the effect of quick transitions from the lower to the higher planes. The highest point reached by the railroads in the Andes is below the perpetual snow line, and while the atmospheric pressure varies with the height, it varies also in different localities, and not at all uniformly. At an elevation of five kilometres (about three miles) the pressure of the air and the quantity of oxygen became reduced by about 47 per cent., and even at an elevation of three kilometres (about 1,860 miles) this reduction already amounts to 31 per cent. Under these conditions active work is attended with considerable difficulty, and one must necessarily become acclimated before being able to carry on manual labor with moderate comfort. Such acclimatization frequently involves going through an attack of mountain illness which has been aptly compared to the seasickness of ocean travelers. This illness is accompanied by general depression, extreme fatigue, headache, bleeding from nose and mouth, and is even fatal. The action of the exceedingly dry air on the skin also is disagreeable and very pronounced, causing the skin to crack unless well greased. This dryness of the air, however, is not without good features, since it prevents oxidation of metal and the decomposition of organic matter. The latter



dries up very rapidly, and ultimately crumbles to dust. This is said to be true also of the woods used at those high altitudes.

Edwards' Improved Window Sash.

The illustrations show a new form of window sash and



O. M. Edwards, Syracuse, N. Y.

Foreign Railroad Notes.

A railroad club has been established in St. Petersburg after the model of the very successful one in Vienna; the members being railroad officers and employes of all branches of the service. It already has more than 300 members.

The Russian Warsaw & Vienna Railroad has received 19 monster locomotives built exclusively with Russian materials at the Kolomna Locomotive Works. It is reported that these engines can run 80 miles an hour, and that they will soon be put into service where a train will run regularly 53 miles an hour. We shall take the liberty to doubt both statements.

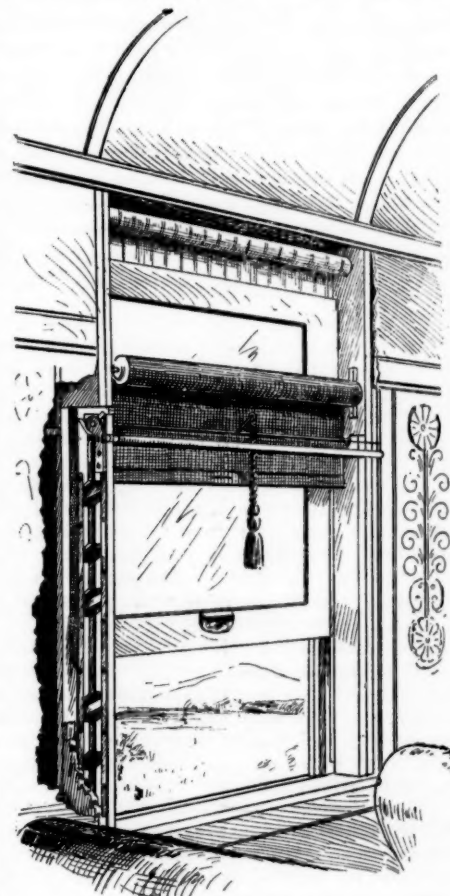
The Wiener-Neustadt Locomotive Works, the most important in Austria, reports for its business year recently expired that business was less favorable than in either of the two years previous, and for the current year it has orders for 36 locomotives and 24 tenders, with more in prospect. The disposable profits of the last year were about \$65,000, out of which a seven per cent. dividend was declared, which absorbed about \$55,000.

The Railway Press (London) advocates the abolition of first class passenger carriage on the Midland Railway,

which long ago gave up the second class on its lines. During the first half of this year the Midland had only 631,408 first class passengers, against 16,928,757 third class. The first class pays about 60 per cent. more than the third class, and though the first class journeys are doubtless on the average longer than the third class, it may very well be that the difference does not pay the additional cost.

The company which proposes to build a deep tunnel electric railroad in Berlin ("Greathead system") estimates its cost at \$347,000 per mile of single track tunnel, or \$694,000 per mile of double line. Two lines forming a cross are proposed, a north and south line substantially on the line of the Friedrichstrasse, which is the principal street in that direction, crossed by an east and west line under the Leipzigerstrasse and its continuations, which is half a mile or more south of the present elevated city railroad.

On the 13th of November last was celebrated the fortieth anniversary of the opening of the railroad between St. Petersburg and Moscow, the "Nicholas Railroad," as it is called. This railroad, 400 miles long, was built in defiance of common sense, on as nearly as possible a straight line, largely through hills and swamps where traffic could not easily reach it, having only 40 miles of curves in the whole length. It was made a double track road from the beginning, with all stations of stone. Its cost was \$244,000 per mile, and this for a movement of one train each way daily. The line has been of great



Edwards' Sash Lifter.

importance to Russia, serving as an outlet, and practically the only outlet, for a vast productive territory beyond Moscow, while the country on the line of the road produces very little for shipment.

The Berlin Society of Railroad Surgeons recently discussed the subject of mental diseases in railroad service, particularly with regard to the question of the readmission to railroad service of employes who have been insane and have been discharged as cured. It was agreed that this should only be done with the consent of an alienist. Professor Mendel, who had had great experience with such cases, said that where patients had suffered from hallucinations or from mania, or victims of melancholia, they might be re-employed; but epileptics, including those with hysterical-hypnotic symptoms, and victims of alcoholism are too subject to sudden relapses. In the other cases if the infirmity returns it does so gradually, so that the man himself or his companions can give notice of his approaching infirmity. The society agreed that no one who had been insane should be permitted to act as a locomotive engineer.

The Syracuse Water-Works.

The Commissioners of Appraisal appointed by the Supreme Court to determine the amount to be paid by the City of Syracuse for the plant and franchise of the Syracuse Water Company has awarded to the company \$850,000. This is precisely the amount which Mr. J. J. R. Croes in his report of Jan. 28, 1889, estimated as a fair compensation for the company for the surrender of its works to the city.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in his journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

From the returns of locomotive building by the private shops, that is all other than railroad shops, that we have received up to this date, the output is less than it was last year. We can compare the product of but 13 works in the two years, but these include all of the large works. These show 2,153 locomotives built in 1891, against 2,240 in 1890, a falling off of a little less than four per cent. This is better than we had anticipated from the current reports, which have generally been that the shops were slack. The fact seems to be that within the last two or three years the capacity of the private shops has increased so greatly that what is now but a very moderate business for them would have kept them running nights a short time ago. All but three of the shops from which we have comparative figures fell off this year; and there were special reasons why those three should have increased their output. The total output of 15 works this year (two of which did not report last year) is 2,300.

The pig iron makers (and a good many other people) are looking with extreme interest for the long deferred boom in the rail business, but it still hangs fire. Good Bessemer pig still goes into the products that are ordinarily made from cheaper iron, and crowds the latter out of the market. The heavy orders lately placed by three or four Western roads will keep the Western mills busy for a while, but the Eastern mills are still slack. The rail makers believe that the demand must improve soon and we are inclined to agree with them. The sales for 1891, up to Dec. 1, were a little over 1,100,000 tons and the shipments about 1,000,000. This is less than the ordinary estimates for renewals alone, and such was the case last year. It is argued, therefore, that the roads must soon begin to buy more freely or "run on the ties." Prices are held pretty firmly at about \$30 in the East; and it does not look as if it were wise to wait for a break. The Pennsylvania, with the thrift which good credit permits it to practice, has been a heavy buyer, its orders aggregating 74,000 tons and those of the Pennsylvania Lines west of Pittsburgh 9,000.

There is practically no change in the situation as regards the blockade in grain, and little amelioration can be looked for until the eastern lines have taken care of the large amount of grain that accumulated at Buffalo at the close of navigation. The roads west of Chicago have been compelled to stop receiving shipments of export grain to avoid the blocking of terminals at Chicago. They are receiving shipments for local elevators and for New England and points in the interior and are able to forward

them with reasonable dispatch. Nearly all the eastern lines out of Chicago are receiving a limited quantity of export grain. The Chicago & Grand Trunk and the Michigan Central have been able to keep open all the time. The Lake Shore opened last week, but was compelled to shut down again within about 48 hours. The Pennsylvania, the Baltimore & Ohio and Nickel Plate are in fair shape. The western lines are probably behind now some 3,000 cars on their orders and will not be able to resume the movement of grain until they are able to relieve their cars, which are now largely in use for storage purposes, awaiting delivery at Chicago. Their experience in the past makes them very cautious about again allowing their cars to go east of Chicago. No hardship, however, is being produced by this condition of affairs, except in the case of such farmers as are in need of ready money and are unable to make immediate deliveries.

The proposed division-of-traffic plan which the Chicago eastbound roads have discussed so earnestly and which they regarded as of enough importance to bring it formally before a Trunk Line meeting in New York (Dec. 1) has apparently been laid on the shelf for an indefinite period. Some of the roads directly interested concluded that they did not care even to attend the meeting that was called for Dec. 15, and it was not held. The only reason that has been given for this apathy is the "advice of counsel" that the proposed arrangement would come so near being a pool as to be illegal; but in view of the year's experience west of Chicago with similar plans this reason will probably be regarded as a merely formal one, the natural argument being the more obvious one that freight traffic is now so plenty that rates can be kept in satisfactory condition without an agreement. Freight is not only plenty, but the prospects of its remaining so for a long time are better now than they have been at any time before for several years, so that most people were, in fact, somewhat at a loss to know why the "pool" was proposed at this time. Perhaps it was for the possible effect on Congress; but a pool, that, from abundance of traffic, had no wind in its sails would not amount to much in the way of convincing a Congressman that he ought to legalize it.

A Safety Appliance Bill.

On the 15th inst. Mr. Cullom introduced in the Senate of the United States a bill "providing for the adoption and use of a uniform standard automatic car coupler. . . . and providing for the greater safety of railroad employes, and for other purposes." This bill was read twice and referred to the Committee on Interstate Commerce. Some of its provisions are novel and some of them are extraordinary, and we shall endeavor to give such a summary of the bill as will give a just notion of its character.

Common carriers subject to the provisions of the Interstate Commerce Act and all employes of such carriers, whose duties include the coupling and uncoupling of cars, and who are members of established and recognized organizations of railroad employes, may vote upon the choice of an automatic coupler. This may be of the vertical plane or of the link-and-pin type, but it must couple by impact and dispense with the necessity of going or reaching between cars either to couple or uncouple.

The votes of the employes shall be expressed only through the organizations of which they are members. Every carrier is entitled to one vote for every freight car owned, leased or controlled. The employes shall be entitled to one-third as many votes as are cast by all the carriers. The Interstate Commerce Commission shall decide upon the validity of the votes.

If 600,000 votes are cast by the carriers, and the entire vote for any particular coupler, including the votes of the employes, is not less than 500,000, the President of the United States shall by proclamation declare this coupler to be the standard safety car coupler for use in interstate commerce.

In case no choice of a coupler is made within six months from the passage of the act the President shall appoint a Commission of five competent persons, one of whom shall be a master mechanic [sic] engaged in the construction of cars, one a person engaged in the coupling of cars and one an officer engaged in operating railroads. These commissioners shall receive a salary of \$5,000 a year each and may appoint a secretary with a salary of \$2,500 a year, and \$70,000 is appropriated to enable the Commission to carry out its work. This Commission is authorized to take testimony and make tests and investigations of couplers presented to it, and when a majority of the Commission decides upon a coupler that fulfills the requirements of the act the President shall proclaim this coupler the standard.

Incidentally this Commission is authorized to report to the President any device, appliance or method the use of which would secure greater safety to employes.

After the President's proclamation as above, it shall be unlawful for any common carrier to construct or equip any freight car to be used in interstate commerce with any other than the standard coupler. It shall be the duty of the carriers to equip at least 10 per cent. of their freight stock per annum.

Other sections of the act provide that carriers shall, within 90 days, equip every locomotive with a driver brake, and shall, as soon as practicable, equip all freight cars with the power train brake in common use, adapted for application by the engineer upon the locomotive. After Jan. 1, 1893, it shall be unlawful to run any trains

that have not a sufficient number of cars in each equipped with power brakes to control the speed of the train without the use of the hand brake.

Failure to comply with the provisions of this act will be *prima facie* evidence of gross carelessness, and the corporation failing shall be absolutely liable for the death or injury of any employe or other person, occurring from the use of rolling stock not fitted as above. Moreover the corporation not complying with the act shall be guilty of a misdemeanor and liable to a fine of \$500 for every offense. After the year 1900 any railroad company may refuse to receive cars not equipped in accordance with this act, and will be liable for damages if it loads and starts cars not so equipped.

By another section the American Railway Association is authorized to designate a standard height of freight car drawbars and fix the maximum variation for empty and loaded cars, and if the Association does not fix this standard it is to be the duty of the Interstate Commerce Commission to do so.

It shall be the duty of the Commission empowered to select a coupler to invite bids from inventors, stating in writing what they will accept from the United States Government for their patents.

The introduction of Salvation Army methods into the consideration of mechanical problems, and the funk over alliances and unions in politics have their logical result in this bill, which is the fine flower of *ad captandum* legislation. We sympathize profoundly with the trainmen and yardmen who are killed and wounded in the line of their duty; we have a certain respect for the honest feeling back of the exhortations and the tears that have been freely poured out before all sorts of bodies in behalf of "the brave young men" who are glad of a chance to earn a living by working for railroads. But we protest against the persistent ignoring of the facts in the case. We recognize the right of railroad employes, and all other workmen to form organizations, and have often expressed the belief that such organizations will be stronger and more useful in the future than they have been in the past; but a man has just as many rights outside of an organization as he has in it, and to disfranchise him because he prefers to remain independent may be good "politics," but it is bad statesmanship. It is these two features in the influences that have shaped this bill—the substitution of tears for facts, and the bid for trade union votes that seem particularly vicious in the measure. Otherwise it is simply weak, and it will probably fail from its own absurdity.

Some of the facts are that experiments with automatic couplers have been made, and are being carried on now by the railroads on a colossal scale. The money expended in the purchase and application of the M. C. B. coupler for freight cars cannot have been less than \$5,000,000, and it is being tried on some 200,000 cars, distributed all over the country. The results are being watched by hundreds of men accustomed to financial responsibility and to mechanical investigation, and who have a keen interest in getting at all the facts. The same thing is being done, only to a less extent, with several automatic link-and-pin couplers. The actual result is that the automatic coupler is being selected and developed by the scientific method and that to-day the M. C. B. coupler is being put on freight cars at the rate of probably not less than 10 per cent. of the total equipment per annum. Now it is proposed to substitute for this natural and scientific method one of two other methods.

1. A coupler is to be selected by a vote. This vote will probably fail to select as it is not likely that 500,000 votes can be counted "for any particular coupler," although possibly so many might be cast for a type. The railroad companies cannot be made to vote solidly for the Janney or the Gould, the Standard, the Trojan, the Hinson, the Safford (not to mention half-a-dozen others), or any other one coupler, and they ought not to. They would, however, vote pretty solidly for the M. C. B. type. Organizations of employes have in the past voted repeatedly for the Safford automatic link-and-pin coupler. So the failure of the voting plan may be predicted from the start.

2. If the coupler is not selected by vote it is to be selected by a Commission, the composition of which is given above. The commission of hundreds of men who have spent millions of money and years of time, and who are day by day selecting and buying automatic couplers, is to give place to one master mechanic, one yardman, one superintendent and two politicians, with one year for investigation and \$70,000 to spend on their own salaries, their secretary, clerks, offices, etc. It sounds like opera bouffe, does it not? But it isn't; it is a real bill, introduced in the Senate of the United States.

Supply and Demand in Railroad Service.

Many of the laws of political economy are somewhat uncertain in their operation; but one thing is sure, that if you reduce rates by legislation you will get less service than if you leave the owners free to make what rates they can. If you prescribe inadequate

tolls for the use of invested capital, you will have less investment of capital than would otherwise be the case.

The present overloading of facilities for moving freight are simply an instance of the operation of this general law. Legislation in its different forms on the one hand, and reckless competition of railroad agents on the other, have reduced rates below a living basis. A railroad when once built cannot withdraw from a losing business, nor can it, under any ordinary circumstances, be allowed to wear out. But cars can be withdrawn from service; they can and do wear out very rapidly, and it is optional with the railroad to replace them or not. As a consequence of this, in spite of increased mileage and vastly increased freight traffic, we have few more cars than we had a year ago and not a great many more than we had three or four years ago. The reduction of rates has increased the amount of goods seeking transportation; it has diminished the amount of transportation facilities until they are inadequate for carrying the goods. In other words, the supply of transportation service, which four years ago was decidedly in excess of the demand, is now barely sufficient to meet it. For this cause we find a serious scarcity of cars; not the local scarcity which is always felt at this season, but a general and widespread deficiency in actual car space available.

What has happened in this case is only an example of what happens everywhere when the consumers try to take the management of property out of the hands of the owners. When prices are too high, there are two methods of reducing them, either to prescribe a low rate by law, or to encourage the additional production of goods. The former course is like treating a disease by repressing its symptoms. The high price is but a symptom of the scarcity; by prohibiting its development you take away the natural means of relief of the disease. The law has given property owners freedom to make rates, because this has been proved by actual trial to be the best means of keeping the supply adequate to meet the demand. If the customers try to fix prices to suit themselves they will generally fix them so low that some people have to go without the things they want. If capitalists are invited to assist in supplying the goods, and are allowed to make what prices they can get, the amount offered is at once increased, and the increase in amount of goods rapidly brings prices down to a fair level.

In the early days of American railroading we invited the investment of capital with the utmost freedom, and even went so far as to encourage it to an unwise extent by subsidies and by land grants, as well as by loose methods of financial management, which gave undue stimulus to speculative construction. As a result of all these things the supply of railroad service has been habitually in excess of the demand, and the shippers have been in a position of advantage. There have been exceptions to this rule; notably in 1878, after a long period of slack railroad construction due to the reaction against the Granger laws, and again, to a less marked extent, in the beginning of the year 1886. But, as a rule, our lines, our equipment and our train service are all more or less in advance of the needs of the communities whose goods they are intended to carry. They are calculated to meet a future demand rather than a present one. For this reason we have slackness in allowing the use of cars for storage purposes and inadequate arrangements for getting sufficient mileage out of those that are interchanged. It is not so much due to bad economy as to over-construction of roads and over-supply of cars.

If there comes a time like the present, when there are not cars enough, and when eastern roads as well as western are beginning to refuse freight on a large scale, we consider it as something wholly exceptional. In Europe it is considered much more natural, especially in those countries where the Government has a practical monopoly of the railroad service. Under such circumstances railroads and cars are not, as a rule, built in advance of the demand, unless it be for military purposes. The Government wishes to utilize its capital to the utmost. For this purpose it is apt to keep the facilities down, since it has no fear of outside competition. It can, if it so choose, make lower rates by limiting its supply of service within the demand. Freed from the stimulus of competition, it will almost always pursue a narrow as distinct from a broad policy, and will seek to economize by making low rates and keeping its cars and lines fully employed, rather than by building lines rapidly and increasing car service and train service at some apparent sacrifice of economy. If we compare the results of monopoly with those of free competition, or the results of state ownership with those of private ownership, we shall find the chief difference, not in the matter of higher or lower rates, but in the matter of more restricted in-

stead of broader use. A few comparative statistics for the United States and Germany will serve to throw light on this point.

	Germany.	United States.
Population.....	48,000,000	62,600,000
Freight cars.....	272,829	1,061,970
Ton-miles.....	14,375,000,000	79,199,000,000

Looking at these figures we see that Germany, with three-fourths of the population of the United States, has but one-fourth of the number of freight cars and less than one-fifth the freight movement. The freight movement *per capita* in Germany is not quite one-fourth that in our own country.

The differences in passenger service are in some respects still more marked. The amount of passenger service is measured not merely by the car space furnished but by the frequency of trains in proportion to population. As has been often pointed out in this journal, there is no limit to the reduction of passenger fares in a densely populated country if it can be accompanied by a reduction in the number of passenger trains. The Indian railroads can carry passengers at one-half or one-third of a cent a mile, or in exceptional instances at rates still lower than this, if they can make their trains few enough in number to secure train loads of from 300 to 600 passengers. Six hundred passengers at one-third of a cent a mile means train-mile receipts of \$2, an exceedingly handsome figure. No such policy can be adopted in the United States, because almost any passenger would rather pay two or three cents a mile than wait six hours for his train to come. Where a man makes only 25 cents a day he can wait all day to save 25 cents; where he makes \$2 a day he prefers to pay a dollar more and have the time of the trains suit him. The demand in America is for increased facilities rather than for reduced rates. The crowding and inconvenience which has been attendant upon the reduction of passenger fares in Central Europe during the last few years, especially in local traffic during the summer time, are such as the American public would not for a moment tolerate. It desires cheap rates, but it still more clearly desires frequent trains and sufficient air space. This being the case, we need more cars *per capita* and more trains *per capita*, and we get them. We build roads where Europe would build none; we often have ten trains daily for a population so sparse that Europe would content itself with three or four; we have car space in measure far more abundant than theirs. If for any reason the supply of transportation *per capita* is reduced to anything like scarcity, we raise a cry of car famine, where Europe would accept the inevitable. We treat railroads as business, and intend that the supply shall meet the demand; Europe treats them as public works, and is content to let the demand adjust itself to the supply as best it may.

Cheap Railroad Service in India.

The official administration report for 1890 on the railroads in India, submitted by Lieut.-Col. R. A. Sargeant, R. E., "Officiating Director-General of Railways," contains among its numerous tables one giving the ordinary regular fares for different classes of passengers and rates for different kinds of freights on each of the Indian railroads. These differ greatly on different lines, but except on a few short out-of-the-way lines, even the first class fare is quite moderate, ranging from 2.25 to 3.38 cents per mile. As the first class travel is but 0.71 per cent. of the whole, it probably does not nearly pay expenses on most lines, where there would not be on the average a single first class passenger per train. There is one mountain line in the Himalaya where the first class fare is 13½ cents per mile, however, the second class 6½ cents, and the third class 2.82, and it has no lower class, as nearly all the other lines have; but this is altogether exceptional. The second class fares are usually just one-half the first class—1.13 to 1.69 cents per mile, and 2.71 per cent. of the travel is second class—doubtless also non-paying on many lines. In the third, or "intermediate" class, which has 5.15 per cent. of the travel, we find rates of 0.564, 0.752 and 0.85 cent per mile—so that three-quarters of a cent per mile fails to attract any considerable number of passengers. A considerable number of lines have no intermediate class.

The rates on the lowest class, called third or fourth according to the style of the class next below the second, range from 0.282 to 0.564 cent per mile, the lowest rate not being general for any line, but only for the longer distances or for special circumstances. It occurs only on the Madras Railway, where the lowest class rates are given as 0.282, 0.376 and 0.564 cent per mile. On the great railroads of India the fares per mile of the lowest class are: East Indian (1,752 miles), 0.47 cent.; Northwestern (2,477 miles), 0.376, 0.423, and 0.470 cent; Great Indian Peninsula (1,447 miles), 0.564 cent by mail trains and 0.470 by other

trains (mostly mixed trains, probably). On the Indian Midland (734 miles), the fourth class rate is 0.501 cent per mile for the first 100 miles, 0.47 cent for the second 100, 0.437 cent for the next 200 miles, and 0.376 cent for distances over 400 miles.

The average fares per mile actually received on the whole Indian system, ascertained by dividing the aggregate receipts for each class by the aggregate passenger mileage of that class, were:

First class.	Second class.	Third class.	Fourth class.	Average.
2.35 cts.	0.927 ct.	0.577 ct.	0.438 ct.	0.472 ct.

The actual receipt per mile for second class passengers is much below the regular rate on any railroad, perhaps due to a great deal of free traveling in that class. Some figures given in our issue of Nov. 27, based on a summary in an English journal, were too high, due probably to that journal's taking an old exchange rate of the rupee. The above figures are based on a value of 36 cents per rupee, which was very nearly its value at the rate of exchange prevailing last year. India has a silver currency, and when silver was at par with gold these rates were just about one-third higher—that is, the 18 pies per mile, which are worth 3.38 cents now were worth 4.51 cents when the rupee was worth 48 cents in gold, as it was when the rates were established.

The official report gives the average expense per passenger mile at 0.139 cent on the East Indian Railway, and as only 0.126 cent on the Bengal & North-western, a metre gauge line; but the tables do not show how this expense could have been calculated, and it is very likely that too large a part of the expenses was charged against the freight traffic. The average earnings per passenger train were \$1.16, ranging between 87 cents and \$1.52.

Freight trains earned an average of \$1.53 per mile, ranging from 81 cents to \$2.84. The expense per ton mile is given as 0.331 cent on the East Indian Railway, where it was lowest. As a very large proportion of the trains (apparently nearly two-fifths of the total train mileage) carried both freight and passengers, we do not see how it was possible to divide the expenses between the two branches of traffic, even in the imperfect manner possible with separate trains and complete statistics; but we give the figures of the report. It does not mention the average freight rate, but we find by computation that it was 1.19 cents per ton per mile, which is lower than almost anywhere else, except in this country. The average on the East Indian, the most prosperous railroad, is 0.97 cent per ton per mile; on the Great Indian Peninsula 1.48 cents, on the Bombay, Baroda & Central India 1.455, on the Northwestern 0.98 cent.

It is generally understood that a tropical climate has such a depressing influence on the human organism that a man does much less in a day than in more temperate regions. The same seems to be true of locomotives in India. On the great lines of that country the average mileage per locomotive was for the most part less than 20,000. The East Indian engines averaged 17,742 miles in 1890; the Northwestern, 16,131; the Great Indian Peninsula, 17,389; the Rajputna & Malwa, 14,440. The average of all Indian roads is not given, but 3,747 locomotives used in conveying traffic made a total of 52,437,247 traffic train miles, or only about 11,330 miles each; but this is, of course, much less than the engine mileage, so much of which goes for switching, etc. Contrast these figures with the 24,610 miles on the British railroads and the 35,650 miles on the selected American railroads reported recently by Mr. M. N. Forney. The Indian report gives the engine mileage per engine only for the 16 principal railroads, and this ranges from 11,130 on the Bengal-Nagpur to 24,333 on a line owned by a native prince but worked by a company which has only 30 engines. On three other lines the average per engine is more than 20,000 miles, but the four companies whose engines have such a mileage have together but 330 locomotives, while the four lines we named first in this paragraph have 2,073. There would seem to be room for a great economy in India under this head. Apparently the Indian engine runs on the average not more than 50 miles a day. The enginemen are still chiefly white. At least there are but 826 native enginemen, while there are 3,747 engines.

There is no detailed statement of working expenses which makes it possible to find how much wages, repairs, etc., cost per train mile, but the total "locomotive expenses" averaged 23.3 cents per mile, and on the East Indian (where coal is cheapest) were 15.8, and on three other great roads, where coal is dear, 27.3, 29.2 and 29.5 cents.

Train loads must vary immensely on different lines, for there is a great variety of gauges—2 ft., 2 ft. 6 in., 3 ft. 8½ in., 4 ft., and the standard 5 ft. 6 in. About 6,800 miles are of metre gauge, and many of the lines in progress are of that gauge.

As things now are, the success of a demurrage bureau depends, more than upon any other one thing, upon the amount of collections refunded; and the annual statement of the Western New York Car Service Association, lately published, wherein it appears that a quarter of the amount collected during the year has been refunded to consignees tends strongly to show, upon its face, the correctness of the opinion expressed by a prominent officer of one of the roads interested, that the tact of the Manager, Mr. Van Etten, is to be credited with the successful results of the year. Our assertion may seem paradoxical, and we must, of course, assume that money must first be collected before it can be refunded; but the comparative novelty of the idea of demurrage, the varied feeling among consignees as to the reasonableness of the rate per day, the fact that consignees are so largely actuated by feeling instead of reason, the inherent inequalities in a system which does not allow for rainy days or delays on the road, and which charges for the use of a car when it is a drug in the market, all conspire to make the function of the man who can modify or wipe out the bills a vital element in the whole scheme. A demurrage bureau, worked under inflexible rules, or even under such moderate flexibility as prevails elsewhere in the freight department, may be suspected of failing in its mission. Mr. Van Etten reports that the approval among consignees of the principles of the association, already highly satisfactory, has become more confirmed during the last few months. In August, September and October the freight business done in Buffalo was 30 per cent. more than ever before, but it was handled with less friction than were the smaller amounts in previous years. Following are the principal statistics of the report:

Total number of cars handled.....	405,260
Total average detention per car.....	1.81 days
Average detention prior to formation of the association.....	4.64 days
Total amount of earnings.....	\$55,438
Total amount collected.....	52,867
Of which \$2,510 was earned in previous year.	
Of the earnings of this year 90 per cent. has been collected.	
Total amount uncollected.....	5,840
being 10 per cent. of the earnings.	
Total amount refunded.....	12,626
being 21 per cent. of the collections.	
Total amount of expenses.....	13,356
being 25 per cent. of the collections.	
Leaving a balance to the credit of the association.....	26,885
There have been 1,187 claims presented for refunding of car service collected amounting in the aggregate to.....	20,112
The amount refunded on these claims was.....	12,626
The amount refunded being.....	7.487
or 37 per cent. of the amount claimed.	
Earnings per car handled.....	cents 13.6
Collections per car handled.....	" 12.4
Uncollected per car handled.....	" 1.4
Refunded per car handled.....	" 3.1
Expenses per car handled.....	" 3.3
Net profit per car handled.....	" 6.6

The Association now handles about 40,000 cars a month, at 207 stations. On some of the roads in the Association the Station Agents include demurrage bills in their regular freight account, a plan which Mr. Van Etten regards superior to that of handing the money over to the Demurrage Association.

The project of running regular trains 223½ miles without a stop, which has been under consideration by the officers of the Michigan Central for some time, now seems likely to be carried out. This is the distance from Windsor to Falls View, on the Canada Southern division, and we have official information that the track tanks and other improvements necessary on that division have been decided upon. The drawbridges have already been protected by interlocked signals, the equipment of the railroad crossings in a similar manner is now going on, and the track tanks are to be built next spring. The signaling of railroad crossings throughout the main line of the Michigan Central has been continuously prosecuted for the past year. The World's fair of 1893 may or may not result in Chicago swapping places with Paris as regards their relative importance as centres of the fine arts, but that it will result in important improvements on the railroads seems already certain. The great increase of traffic in 1876 accelerated improvements chiefly on one road, the Pennsylvania, but the movement now beginning will doubtless affect a score of lines, and passengers to and from Chicago will doubtless have cause, for years after, to congratulate themselves on this temporary rush of travel. And railroad officers will of course always be glad that they had such a good chance to bring their appliances more nearly up to their own ideals. Moreover, their satisfaction with such improvements as interlocking and track tanks need not rest wholly on the advantage accruing to the passenger department or the advertising agent; the freight service as it grows larger also comes in for an important share of the benefit. The Pennsylvania, which now has its New York division substantially all four-track, is equipping all four of the tracks with track tanks, and the freight engines of that division are, we understand, to be equipped with scoops, so that they can use the tanks. The great weight and length of the freight trains now run renders a stop, with its possibilities of breakage, increasingly annoying, not to say costly, and this action of the Pennsylvania is palpable evidence that the expenditure of considerable sums to abate this annoyance is warrantable.

The Georgia Railroad Commissioners are rivaling those of Texas in willingness to reform the world. If the ability of these officials to cure long standing evils were equal to their willingness Justice would soon be

able to give up her tiresome job of holding an empty pair of scales and could rule some of our states in peace and luxury. The Georgia Commissioners have lately issued a circular prescribing that "when any railroad company fails to deliver freights at the depot or to place loaded cars at an accessible place for unloading within 48 hours (not including Sundays or legal holidays), computed from 10 o'clock the day after the arrival of the same, the shipper or consignee shall be paid \$1 per day for each day said delivery is so delayed." The weaver who had to pay two fines for two adjacent holes in the cloth which he had made took but a few seconds to decide to consolidate the two into one by running his thumb through the fabric; and it will probably require a still shorter time for the railroads of Georgia to decide, if this rule is enforced, that, as their liability for delays before freight arrives at destination is far less accurately defined, they will lump the whole under that head by taking care not to take a car to its destination until the yard tracks are clear to receive it. The Commissioners evidently forgot that in times of blockaded yards it is generally as easy to hold cars back 50 miles as to bring them directly to their destination, especially when a state commission allows 48 hours in which to place cars after their arrival. This allowance is, however, so absurd that we are not sure but the announcement is a newspaper "fake," after all. If it was issued to please the consignees it ought to have read 48 seconds instead of 48 hours.

The newspapers of Massachusetts are printing a decision of the highest court of that state* which may have an important bearing on the attitude of the police toward locomotive runners, though it makes no technical alteration whatever. While the law is not changed and the question would doubtless have been decided in the same way if it had come up years ago, the absence of a judicial opinion has led to a general sentiment among magistrates and police officers that a runner is presumably innocent of any crime, when his engine strikes a man; and arrests have therefore been rare. This sentiment is a rational one, based on the time-honored principle that a man must be assumed to be innocent until proved guilty, and as long as locomotive runners as a class are reputable citizens it would seem to be a sound one. But a narrow-minded or unprincipled policeman needs nothing more than a decision like the above to lead him, if he is seeking ways to magnify his office, to arrest every locomotive runner whose engine hurts a man. There is no more danger of unjust punishment by the courts than before, but the annoyance and disgrace of a mere arrest is bad enough, and it is that which we protest against. Quite likely the officers of the law in Massachusetts are so enlightened that a protest is needless; but, in view of the condition of things in an adjoining state (New York), it is worth while to make a passing note of this decision. In such half-civilized communities as Mexico and New York City an engineer is arrested and marched to the lock-up on the flimsiest pretenses—even in clear cases of suicide—and railroad officers should do what they can to prevent the spread of such a custom.

A number of bills have been introduced in the United States Senate embracing amendments to the Interstate Commerce law. The telegraphic summaries published do not give a clear idea of the changes proposed, but the principal features seem to be those designed to strengthen the law at various points and to aid in its enforcement. One bill aims to prevent discrimination by the use of private stock cars, and another to make the payment of secret rebates on freight shipped through Canada more difficult of accomplishment. The obligation to publish joint rates is restated in more explicit language. Statistics contained in the annual reports of carriers to the Commission are to be received as prima facie evidence in legal hearings, and copies of or extracts from any tariffs, agreements or reports, certified by the Secretary of the Commission, are to be received in evidence. An amendment to Section 16 provides that on an appeal to the Circuit Courts of the United States the hearing shall be confined to the record presented from the Interstate Commerce Commission, except where the party has a right to trial by jury, when the case shall be tried anew.

The November issue of the *Journal of the Association of Engineering Societies*, just received, contains an important contribution to the subject of Bridge Legislation. It is the report of a committee appointed by the Western Society of Engineers, Mr. O. Chanute, President Am. Soc. C. E., Chairman. The report proper, which fills nine pages, gives a résumé of the laws of various countries and states, and discusses the general subject briefly.

* Ever since railroads began to run in this state there has been no penalty for killing men walking on the track, but the Supreme Court has decided in *McCreary vs. Boston & Maine*, that the phrase "upon the road contrary to law" does not excuse a company from liability to trespassers who were killed through the gross and wanton negligence of the engineer, giving this phrase a broad construction. *McCreary* was killed by an engineer who could see him on a straight track 1,200 ft. away, and did not attempt to stop his engine until he struck *McCreary*, who was in an epileptic fit on the track, where he had no right to cross, and was therefore a trespasser. In accordance with this decision it will hereafter be a question of fact for a jury whenever a trespasser is killed, whether or not he was killed through the gross recklessness of the engineer. Probably many thousands of people have been killed within the last 40 or 50 years while trespassers upon the railroad tracks of Massachusetts.—*Boston Advertiser*.

In short, the conclusion is that there should be a special engineer to look after the safety of bridges, and that the expense to a state could be kept within \$8,000 or \$10,000 a year. Appendices give at considerable length the bridge regulations of England, France and Austria, the Massachusetts law and drafts of acts prepared by the Engineers' Club of Kansas City, and by Mr. C. F. Stowell, Bridge Engineer to the New York Railroad Commission.

The complaint of a lack of cars, freight blockades, etc., is common at this season of the year, when the chief crops all are likely to be sent forward freely, in nearly all parts of the country, so that the demand for cars in one section cannot be supplied from another. That the supply of cars this year at this time should be more than usually short was to be expected; for there have been exceptionally large crops of almost all kinds, and the short crops in other countries have caused unusually large shipments of some of them. The complaint is chiefly concerning grain shipments. Now the receipts of grain of all kinds at the nine markets during the four weeks ending Nov. 28 have been, in bushels, for the last four years:

1888.	1889.	1890.	1891.
28,062,372	37,245,370	32,238,362	52,793,359

The November shipments largely go into elevators, and must be shipped after the close of navigation. That the facilities should not have been increased sufficiently to provide for an increase in movement of more than 60 per cent. in a single year ought not to surprise any one. The movement was exceptionally large in 1889, but this year it was 40 per cent. greater than then even.

The Postmaster-General, in his last annual report says that the growth of mail traffic on the lines running special fast mail trains has made this work so profitable to the railroads that the special allowance appropriated by the Government in 1879 to pay for extra speed and accommodations is no longer necessary, and he purposes to omit this appropriation from his estimate next year. This appropriation was first made in 1879 (\$295,000 a year), and Mr. Wanamaker says that the quantity of mail matter transported has about doubled since then. This report, beside recommending pneumatic tubes for use by the post office in cities, reiterates in detail the previous suggestions of the Postmaster-General on the advisability of annexing a telegraph department to the post office system, and he further suggests that the post office department ought to have an elaborate system of telephone lines.

Last week the *Financial Chronicle* published its usual showing of net earnings of railroads for the month of October. Briefly, the results are as follows: The gains in net earnings for the month were \$2,722,000, or 10.8 per cent. In no month of this year or of 1890 was the absolute gain as large, although in several months the ratio of gain has been greater. In September the increase in earnings was 10.32 per cent., and in August 5.52. One peculiarity of the year is that for the 10 months the gain in net was 6.48 per cent., as compared with a gain of 4 per cent. for the same period in 1890. In the gross earnings, however, the increase for the 10 months this year has been but \$22,365,000 as against \$36,047,000 last year.

The "Monon" and the Lake Erie & Western are considering a clever notion for handling the World's Fair passenger traffic. This is to run steamers from Michigan City to the fair grounds. Passengers arriving at Michigan City can secure berths and living accommodations on a steamer, which will run across to the fair grounds during the night. After spending the day at the fair they can return to Michigan City in the same way. Such a plan would be a great convenience and unquestionably very popular, as it would do away with much of the discomfort and expense of getting lodgings and meals near the fair grounds or getting back and forth by an all rail route.

TRADE CATALOGUES.

Iron and Steel Working Machine Tools.—The Pond Machine Tool Co., Plainfield, N. J., New York office, 111 Liberty street.

In the preface to this catalogue the company says that it is intended to give a general idea of the varieties and sizes of tools built, but that for the latest designs and prices intending buyers should send to the company. The tools illustrated are planers, drilling and boring machines, radial drills, wheel presses, driving wheel lathes, etc., and several of them are of extraordinary dimensions.

Boring and Turning Mills with Extensible Housings.—The Niles Tool Works issues a circular showing boring and turning mills with housings to admit work up to 14 ft. and 20 ft. in diameter.

Rack Railroads.

The eight purely cog-wheel mountain railroads in Switzerland measure in the aggregate 45 miles in length, and overcome an aggregate elevation of very nearly seven miles. The maximum grade is 48 per cent. on the Pilatus Railroad; no other has more than 25 per cent. It should be said that four of these lines, with nearly half of the total mileage, are not yet completed. All the newer ones, in fact all except the two lines of the Rigi, have a gauge of 31½ in. Two of the lines under con-

struction are of the Abt system, the other two, like the Rigi roads, have the cogged rail known as the "ladder" rail. The cars of all except the Pilatus road are open, and on all the new lines, as also the one opened last year up Monte Generoso, they are 8-wheeled, but they seat only 48 persons, while the 4-wheel cars of the Rigi roads seat 60 each.

The highest speed permitted is less than 6 miles per hour. The locomotives, with fuel and water, vary in weight from 31,900 to 38,500 lbs., except on the Pilatus road, where the engine weighs but 20,460 lbs. and hauls a single car weighing but 2,400 lbs. On the other lines the gross weight of train is from 26 to 33 tons.

The fares are always less for the descent than the ascent, and for the round trip usually less than the sum of the two. This is probably because people who know anything about mountains are aware that not only is it very hard work, but there is comparatively little to see (unless you stop and turn around) going up a mountain, while going down the whole landscape is before you and you are able to enjoy it. The highest fares are on Pilatus and the Rothhorn, on both of which the charge is 10 francs up, 6 francs down and 16 francs for the round trip. On the one of the Rigi roads which has the chief part of the travel the fares are 7 francs up, 3½ down and 10½ for the round trip; on the other, which is reached less conveniently, the charge is 8 francs up, 4 down and 11 for the round trip; on the Genoso road, 7.50 up, 5 down and 10 for the round trip.

These railroads are not nearly as costly as might be supposed. The principal Rigi road has cost \$170,000 per mile, the Pilatus, which is highest and steepest of all, about \$156,500, the Genoso, only \$62,630, and three of the incomplete lines are to cost less than \$88,000 per mile. The working expenses are not very high, being greatest on the principal Rigi line, and there \$2.79 per train mile; on the other Rigi road \$1.42, on the Pilatus \$2.61, on the Genoso \$1.30.

Doubtless there will be in time a great field for such railroads in this country, and it is possible that several might be made to pay now, in the White Mountains and the Catskills.

TECHNICAL.

Manufacturing and Business.

The Adams Track Clamp Co. has been incorporated at Birmingham, Ala., with a capital stock of \$150,000 to manufacture patent track clamps. The incorporators are J. F. Adams, R. Randall and others.

The Harris Car Co. has been incorporated in Putnam, Conn., with the following officers: President, L. J. Harris, Boston; Vice-President, H. C. Willis, Boston; Directors, E. W. Wheaton, H. C. Willis, L. J. Harris, George M. Morse and L. H. Fuller. The capital stock is \$1,000,000 and preferred stock \$250,000.

Receiver Henning, of the Indianapolis Car & Mfg. Co., filed an additional report Dec. 17. During the last 14 months he received \$348,897 and paid out \$312,201. The face value of the concern's assets not yet converted into cash is \$81,517, but the actual value is very small. The claims filed against the company amounted to \$891,683. So far 14 cents on the dollar of the approved claims has been paid.

The directors of the McLeod Car Heating & Ventilating Co. have recently elected these officers: George R. Brine, of Boston, President; J. L. Robertson, of Robertson & James, New York, Vice-President; George C. Hall, of New York, Secretary and Treasurer.

The Ellis patent bumping posts have been put in the Union Stock Yards, Chicago, 15 of them having just been finished at Stewart avenue. The Fort Wayne and Northwestern passenger stations in Chicago are also equipped with these posts, and they are being generally introduced in Chicago.

The Laidlaw & Dunn Co., of Cincinnati, has a number of important contracts for steam pumping machinery in the South, among them for the water works at Gainesville, Fla., which are to have a capacity of 2,500,000 gallons. Also for the complete steam pumping plant for the Equitable Building in Atlanta, Ga., one of the finest in the South. The capacity of these pumps will be 11,000,000 in 24 hours. They include two large compound duplex pumps.

New Stations.

The Canadian Pacific is to extend its workshops at Woodstock, N. B., and will also erect a new passenger station.

The Baltimore & Ohio shops at Grafton, W. Va., have been materially improved lately. Several new buildings have been erected and general repairs made to the old ones. A 79-in. tire lathe of modern make has been put in the machine shop.

The Richmond & Danville will build a station at Billmore, N. C., to cost about \$18,000.

The Grand Trunk has recently completed a building to be used as a rolling mill at Montreal, and the rollers, shears and heating furnaces and other machinery are being put in.

The Baltimore & Ohio and the West Virginia & Pittsburgh will erect a new freight and passenger station at Clarksburg, W. Va., to be used jointly by the two roads. Plans have been made for a handsome structure and it will be erected as soon as one of the several sites offered for the purpose by the town has been selected.

The Sioux City Terminal Railway & Warehouse Co. will build at Sioux City, Ia., a union station and train shed. The building will be located on Third and Douglas streets. It will be constructed of Minnesota granite, the main structure being three stories in height. The length of the train shed will be 710 ft., and the total cost of station and shed will be between \$200,000 and \$300,000. Five roads will use these terminals: the Sioux City & Northern, Pacific Short Line, Illinois Central, Union Pacific and Chicago, St. Paul, Minneapolis & Omaha.

The Von Borries Intercepting Valve.

It does not seem to be generally understood that the compound locomotives which are doing such excellent service on the East Tennessee, Virginia &

Georgia Railroad, as reported in the *Railroad Gazette* of Nov. 13, were built subject to the patents of Worsdell and Von Borries. These engines have made a saving in fuel of 24.7 per cent. per car mile, while others mentioned in our issue of Oct. 30 have effected a saving of 38 per cent.

The Permanence Roofing.

The Lee Composite Manufacturing Co., of 29 Broadway, New York, has placed upon the market a roofing which is claimed to be especially adapted for uses upon round-houses, blacksmith shops and other places where the material is subject to the corrosive action of the acids and gases arising from the combustion of large quantities of fuel. This roofing is composed of a heavy cotton drilling, coated upon both sides with an application of asphaltum, over which is sprinkled and rolled the ground slag from the assay works of silver ores and other precious metals, while the bottom, or side lying next the roof boards, is covered with paper. When new the upper surface of the roof looks very much like an exceedingly coarse emery wheel, but after being used and subjected to wear it beds down and assumes a finer appearance. It is claimed also that it is unaffected by any temperature between 50 degrees below zero and 170 degrees above. The composition can be used on metallic roofs that have been corroded into holes by the acid action from below. It is also suitable for car roofing, and can be readily applied. In this position it has the additional advantage of affording a rough foothold for the trainmen.

American Steel Barge Company.

It is stated that this company will expend \$3,000,000 during the coming year in addition to the money to be invested in ships. Construction has been begun on the shipyard at Everett, Wash., on Puget Sound. Two more yards will be built, one on the Atlantic coast and the other on the Ohio River. Both of the coast plants will be very extensive and will be fitted out with a view to engaging in naval and general shipbuilding as well as for the construction of "whalebacks."

The company has taken a contract for building at the West Superior yard three freight carrying "whalebacks," to be operated in connection with the "Soo" and Canadian Pacific Railroads. These vessels will run between Gladstone, Mich., the lake port of the "Soo" line, and lower lake ports.

Life of Material on the Rigi Railroad.

It is observed that the iron work of the cog-wheel railroads up the Rigi suffers much less from rust and its ties much less from decay than those of ordinary level lines. The fir ties not treated, laid 17 years ago, are still for the most part in good condition, and the rails generally have not suffered from rust, though the road is closed a considerable part of every year. An iron bridge on the Scheidegg line, which was erected in 1874, was repainted this year for the first time, and it is said that there was very little rust on it, and where the old paint had fallen off, the iron remained clean.

A Big Planer.

The Pond Machine Tool Co. lately shipped a planer weighing 150 tons. It is for Messrs. McIntosh, Hemphill & Co., of Pittsburgh, and will be used for planing large steel castings.

International Engineering Congress.

The Board of Direction of the American Society of Civil Engineers presents the following information and asks the attention of the members of the Society to this subject.

Arrangements are in progress for holding an International Engineering Congress and to provide engineering headquarters in the city of Chicago during the International Exposition to be held there in 1893. The Board has appointed the following named members of the Society as delegates to the permanent committee which has these matters in charge: Past Presidents, D. J. Whittemore and William P. Shinn, and as Alternates, Messrs. J. F. Wallace and Col. W. E. Merrill (Col. Merrill has died since). A permanent organization has been made, of which Mr. O. Chanute, President of the Society, is President, and Messrs. E. L. Corbitt, E. M. Izard, William Forsyth, C. L. Strobel, Robert W. Hunt, John W. Cloud and D. J. Whittemore are the Executive Committee.

Funds are required to carry out the arrangements above indicated and provide and maintain the engineering headquarters. Of the anticipated expenses for this work the executive committee named above estimate as a reasonable share for the American Society of Civil Engineers the sum of \$3,000, and in order that every member of the society may feel and be entitled to the use of the proposed engineering headquarters and to the benefit of all arrangements made by that committee, it is desirable that this sum should be contributed by the members of the American Society of Civil Engineers. The Board of Direction therefore expresses the hope that contributions of a liberal nature will be received from the members of the society who desire the success of these proposed arrangements and who may feel able to make such payments. The subscription of this sum by this society is essential to the success of this movement, and will entitle every member of the society to the privileges indicated. The subscription suggested is to be made by members of the American Society of Civil Engineers, independently of any other subscriptions which may be asked for the same purpose by other engineering organizations to which they may belong.

The Detroit Dry Dock's New Shop.

The Dry Dock Engine Works (Detroit Dry Dock Co.) have closed a contract with the Berlin Iron Bridge Co., of East Berlin, Conn., for a new fireproof modern machine shop. The building when complete will be the finest machine shop on the great lakes and will compare favorably with any in the country. The plant will have every modern appliance, such as electric cranes, two of 20 tons capacity running the whole length of the building, new machinery, electric lights, etc. The shop will be 201 ft. long by 66 ft. in width. The main portion of the building will be 200 ft. long, 37 ft. wide and 50 ft. high in the clear, with 38 ft. of clear space above the floor to the cranes. Large windows will be placed along the sides, giving abundance of light, and a skylight with 12 ft. of clear glass will run along the whole roof. Three galleries, 28 ft. wide, will open out on the main shop, extending its entire length. The first two will be occupied by light machinery benches and the top gallery will be arranged for the storage of patterns. Work on the new building will be begun immediately. Two-thirds of it will be

*Members Am. Soc. C. E.

erected in eight weeks and completed in ten. The remainder will be completed as soon thereafter as the old shop can be cleared away.

Electric Lighting in Chicago.

It is reported on good authority that the Edison Electric Co. will build a large plant in Chicago for lighting the city. The estimated cost is \$1,000,000. The engineers of the company have been mapping out the city to plan a proper location for the plant. There are already a vast number of electric lights in Chicago, and it may be stated that the city is in general lighted by electricity. The large amount of light used has enabled the electric light companies to reduce the cost to a point where it is within the reach of the small consumer, and many private houses are lighted with incandescent lamps.

Pneumatic Carrier System for the World's Fair.

The Illinois Central has granted right of way to the National Pneumatic Tube Transit Co. for the location of a system of pneumatic tubes running from Randolph street to the World's Fair grounds. The grant extends over a period of 25 years. The consideration which pays for the privilege has not been made public. It is intended that the tubes shall carry mail and small packages. The tubes are to be 1 ft. in diameter, and there are switches at various points to throw packages off at intermediate stations. No estimates have been made of the amount of air required to do this. It would certainly take some large compressors.

THE SCRAP HEAP.

Notes.

The Richmond & Danville has discharged 215 men from its shops at Manchester, near Richmond; a similar number at Macon, Ga.; 100 at Savannah, and 50 at Augusta.

Three men lately arrested at Monterey, Mexico, have been convicted of a train robbery perpetrated several months ago, and they were on Dec. 18 condemned to death.

Albert Godfrey was sentenced to five years imprisonment at Cape May, N. J., last week for attempting to derail a passenger train on the Philadelphia & Seashore Railroad.

The Atchison, Topeka & Santa Fe was completely blocked by snow between Las Vegas and the Raton tunnel for four days following Dec. 13. The snowstorm was widespread.

The Chicago & Alton has notified its conductors that hereafter they will be placed under bonds of \$500 each. For conductors now in service the road will bear the expense, having made arrangements with the United States Guarantee Company, of New York.

The locomotive engineers of the Central of Georgia have renewed for another year their contract with the company, made a year ago, fixing the wages of passenger runners at 3 cents a mile and freight at 4 cents. It will be remembered that up to Dec. 1, 1890, the enginemen on this road had been paid by the month.

W. E. Parham, Agent of the Louisville & Nashville Railroad, and of the Southern Express Co., at Scranton, Miss., was arrested in September last for embezzlement of about \$2,600 of the express company's funds. He has now been convicted of the offence and sentenced to three and a half years' imprisonment. His prosecution was carried on by the express company and the Guarantee Company of North America, which was on his bond.

Passenger conductors on the Big Four are now furnished with a blank form bearing a striking resemblance to a laundry bill, upon which they are required to place the number of through passengers, what point they are from, how many passengers are in the sleepers, how many in the chair cars, etc. The report is obviously intended as a check upon the train collectors to prevent any more dishonesty, and seems well adapted for the purpose.—*Western Paper.*

Reports of strikes and threatenings on the part of railroad telegraph operators in New Mexico, Arizona and Texas have been numerous but vague during the past week. The only definite statement of importance is that the Atlantic & Pacific has accepted the wages schedule presented by the operators and dispatchers, which is: "Operators, \$80 per month, twelve hours' work and extra; dispatchers, \$150 for eight hours' work, and chief dispatchers, \$175 per month and no trick work." It is reported that the telegraph operators on the Fremont, Elkhorn & Missouri Valley have been notified that they must leave the Order of Railway Telegraphers or leave the service of the company.

World's Fair Notes.

The first truss of the roof of the electricity building was raised last week. These trusses weigh 18 tons each.

The Morison Tower Co. has requested room for its tower. The request has been referred to the committee on grounds.

Seimens & Halske, manufacturers of electrical supplies, Berlin, have been granted permission to put up a large display at the World's Fair grounds. They have been allotted space for one 1,500 and one 500 horse power generator. The Edison company has only asked for 750 horse power, so far. The German firm has also requested space for the exhibit of electrical railroad appliances, including a track and a mining tunnel, under the mines and mining building, with tram cars in operation. They also desire to run electric boats on the lagoons. They make a further request for space in which to put a 1,000 horse power electric motor, but the request has not been granted as yet.

Spanish American Notes.

The financial extremity of the Brazilian Government, during Gen. da Fonseca's presidency, led to a request for authority from Congress to lease the government railroads for 50 years. This being refused, a lease of the Central Railway for 33 years was ordered during the short-lived dictatorship. This decree has now been annulled.

A national exhibition is to be opened in Quito, Ecuador, in the latter part of March, and the commissioners are anxious to have a full exhibit of American machinery and wagons, and they will offer every facility of transportation from the sea to the capital. It is suggested that this is an excellent opportunity for the display of American agricultural implements and other machinery in a country where practically no labor-saving machinery is in use.

Surveys have just been completed by Mr. Walter Merivale in the interest of the Costa Rica Syndicate for the Costa Rica Pacific Railway, which will join San José, the capital, with Puntarenas on the Pacific Coast, and will afford inter-oceanic communication when it connects with the existing Costa Rica Railway. It is pro-

posed to adopt 8 per cent. gradients with rack rails and 20 degree curves, so as to avoid the numerous deep ravines which cross the route. The Government guarantees 5 per cent. on \$4,000,000 capital, in addition to a grant of 741,000 acres of land to the company.

The Argentine Government returns for 1890 show that the capital invested in the total 5,710 miles of railroad amounted to \$329,120,000, and the gross receipts for 1890 and 1889 were \$16,763,200 and \$17,859,600, respectively, while the expenses were reduced from \$11,632,300 in 1889 to \$11,180,400 last year. The net increase in earnings for 1890 over those for 1889 was accordingly \$356,000. The Governmental obligations on account of guarantees on railroad capital for 1890 amounted to \$3,000,000, being an increase of \$871,000 over those incurred in the previous year. For the current year these liabilities will exceed \$4,500,000.

An effort is being made by Mr. George H. Wheeler in Rosario, Argentine Republic, to secure an authorization for the deepening of the harbor of that port, and for the construction of docks and of such works as may be needed to secure a permanent depth of water. If economically done it would make Rosario one of the greatest ports in South America, but unfortunately the example of Buenos Aires will frighten capital, considering that \$32,000,000 have already been expended upon its harbor with the result that a dangerous stagnation of water has been produced, which can only be remedied by a further expenditure of \$3,500,000 upon the North Channel.

The present crops of wheat and wool in the Argentine Republic are said to be the largest ever known in that country, and the railroads are preparing for a busy season to reconquer themselves for the great falling off in business during the financial depression. It is stated that there is no line of railroad in the country that has rolling stock enough to carry the produce to market. The *Railroad Gazette* pointed out several months ago that this agricultural prosperity in Argentine would follow the late financial crisis. The larger production is not due entirely to a favorable year, but to the fact that the owners of estates who had gone to the city to speculate have returned and are personally supervising their haciendas. The deduction which has been made in some quarters from this sudden increase, that Argentine will henceforth make large progressive gains does not necessarily follow, and will not in all probability be verified.

The Inter-Continental Railroad Commission has received encouraging reports from the three surveying parties dispatched last spring to Central and South America. Three lines have been examined in Central America, with the result of recommending as most satisfactory a route through the "coffee belt," lying between the low Pacific coast lands and the mountains. Corps No. 2, under W. F. Shunk, has located a route from Quito, Ecuador, to Popayan, Colombia. The survey will continue down the Cauca Valley, crossing over, lower down, into the valley of the Atrato, and thence pushing on to Panama. Corps No. 3, under J. Imbrie Miller, is said to have successfully surveyed from Quito to "the border of Peru," which probably means the village of Loja, Ecuador. It will be interesting to learn what conditions they encounter in their proposed effort to locate a line up the Rio Marañon or Amazon, to Cerro de Pasco. It is reported that another party will be sent out next summer to survey a route through Bolivia. Elaborate maps and other results of the work accomplished will be shown at the Columbian Exposition in 1893.

But 49 miles remain to be constructed of the railroad that is to connect Buenos Ayres with Valparaiso. At the recent meeting of the directors of the company in London it was announced that 700 miles are now open to traffic. The work of construction, which was suspended for a time, has been resumed with vigor, and the directors promise that it shall be pushed through without further delay. The mountain section, which is 149 miles in length, involves very heavy work, including many tunnels. The mountain section is to be worked partly by adhesion on gradients of 2½ per cent., or 132 ft. to the mile, and partly upon the Abt system over gradients, the maximum of which is eight per cent., or 422.4 ft. per mile. The opening of this road will be an event of the utmost importance to South America, by affording an opportunity for interstate trade upon a large scale. In fact, the growth of a large flour-milling industry, both in Western Argentine and in Chili, will probably be one of the first fruits of these improved facilities for transportation, and this, together with the greatly reduced cost of shipping cattle from the *pampas*, will lessen the expense of living in Chili. The National Central Northern Railroad in Argentine will probably soon be completed. This will give a second trans-Continental route from Antofagasta, Chili, to Buenos Ayres, *via* the Bolivian plateau, and call into existence an enormous trade, which will be still further augmented when the link between Puno and Huanchaca shall have been closed up. The Peruvian corporation is now negotiating for a charter for a road from Puno to La Paz, which is a good step in this direction.

High Buildings in Chicago.

At a meeting of the Board of Underwriters (Chicago), held Dec. 16, a rate of \$3.15 was adopted for a new high building. So high a rate, it is claimed, is practically prohibitory. The building is to be used for mercantile purposes, and hence a much higher rate is demanded than for a regular office building.

Government Publications.

Frequent inquiries are made of the Secretary Am. Soc. C. E. respecting Government publications. Advance copies of most of these are sent to the society, and acknowledgment is always made in the proceedings, under the head of Additions to the Library, etc.; hence it will serve as a notice of the issue to all members. If application is made in time through the local Senator or Representative, copies can usually be had for the asking. They can be purchased at a fixed price from J. M. Hickcox, 905 M street, W., Washington, D. C., who also issues a monthly catalogue of all Government publications at a cost of \$5 per year. This catalogue has an extensive circulation among the public libraries of the country. Through the courtesy of Gen. Thos. Lincoln Casey, Chief of Engineers, U. S. A., names of members of the society who are especially interested in works such as are under his charge will to a limited number be entered upon his list for future distribution of documents as he may issue.

LOCOMOTIVE BUILDING.

The Toledo, Ann Arbor & North Michigan has recently given an order for five new freight engines.

The number of engines built at the Brooks Locomotive Works in 1891 will probably be 230 before Dec. 31.

The Brooks Locomotive Works have delivered the first of the 10 heavy engines building for the Lake Shore & Michigan Southern.

The Manchester Locomotive Works have nearly ready for delivery five of the 10 engines recently ordered by the Old Colony road.

Three of the heavy six-wheel engines building for the Toledo & Ohio Central at the Brooks Locomotive Works have been placed in service.

The Baltimore & Ohio has issued specifications for new engines. The number on which bids are being asked is not given, but it is believed to be upward of 45.

The Schenectady Locomotive Works have been given an order for 25 engines for the West Shore Railroad. This order is in addition to the 50 locomotives recently ordered by the New York Central & Hudson River road.

The Great Northern has ordered from the Brooks Locomotive Works 15 consolidation locomotives with 19 × 24-in. cylinders. These will be similar in detail to the 15 of the same type recently delivered by the Brooks Works to this company.

The Pittsburgh Locomotive Works, of Pittsburgh, will soon begin the erection of a new building for which plans have been drawn. The building will be erected on ground adjoining the present shops in lower Allegheny. The firm has booked orders sufficient to keep the shops running for nearly six months.

The Richmond Locomotive & Machine Works have built in the past year a total of 38 locomotives of various sizes, mostly for Southern roads and including some heavy passenger engines for the Chesapeake & Ohio. The number of locomotives built last year was 25 and the increase in the output this year has been made under several disadvantageous circumstances. In the first place a full force is at work on the battleship "Texas," then, there was a three months' strike in the summer, and the firm has also suffered from two disastrous fires.

The Baldwin Locomotive Works will have built and delivered this year before Dec. 31, 918 locomotives, of which 101 are compound locomotives. This output is less by 35 than the record for 1890, which was the largest ever reached by the Baldwin works. The engines built in 1891 have included nine Decapod locomotives; 219 consolidation engines, with 4 pairs of driving wheels; 423 with three pairs of driving wheels; 266 are passenger or switching engines, with two pairs of driving wheels, and one rack locomotive was built with a single pair of driving wheels.

CAR BUILDING.

The Western New York & Pennsylvania has just received 10 new passenger cars from the Pullman Works. The Fitchburg is likely to order considerable new equipment in the spring. The amount is not yet decided.

The Lake Erie & Western has contracted with the Haskell & Barker Car Co., of Michigan City, Ind., for 300 box cars.

The Chicago, St. Paul, Minneapolis & Omaha has let a contract for 500 box cars to the Peninsular Car Works, of Detroit, Mich.

Mr. W. Wylie, who was formerly connected with the Liverpool Tramway Car Co., has decided to start car building works at Ottawa, Ont.

The last installment of the 300 30-ton platform cars built by the Southern Pacific at its Algiers shops will be completed this week. These cars are built of southern yellow pine and are 34 ft. long.

The Cleveland, Cincinnati, Chicago & St. Louis has received from the Terre Haute Car & Mfg. Co. 200 of the Hicks live stock cars, and most of them are already in service. The company has contracted with these works to build 300 additional cars of this type.

The Ensign Car & Mfg. Co., of Huntington, W. Va., last week made a shipment of 25 complete sets of iron work for that many 15-ton narrow gauge platform cars, for the use of the Guatemala Central Railroad of Central America. They were shipped from Huntington to New York by rail and thence by steamer to San Salvador.

One of the finest parlor cars in Canada, the Canadian Pacific car "Penobscot," has just been built at the Montreal shops, and will run between Toronto and Montreal. The car has been fitted up almost regardless of expense. The interior is finished in satinwood and mahogany, and the chairs are upholstered in rich drab-colored plush. The smoking room is at one end and a private compartment at the other. The car is the first of its class ever built in Canada.

The Seaboard Air Line has had built 233 freight cars in 1891 in the shops of its subsidiary roads. At the shops of the Seaboard & Roanoke, at Portsmouth, there were built 169 box cars and 30 platform cars. Of these 19 box cars and 10 platform were to replace old cars. At the Raleigh & Gaston shops, at Raleigh, N. C., six caboose cars, three box and 17 platform cars were built. Seven of the platform and the three box cars replaced old cars. At the Carolina Central shops at Laurinburg, N. C., five box and three platform cars were built, all to replace old numbers.

BRIDGE BUILDING.

Anniston, Ala.—The Alabama Bridge Co. has been organized at Anniston, Ala., for the purpose of designing and constructing railroad bridges. The officers are: T. R. Houser, President; C. J. Houser, Vice-President, and W. A. Robertson, Engineer.

Arnprior, Ont.—Two of the new steel spans of the new railroad bridge at Arnprior have been put in place, and the third and last one will follow next Monday.

Beverly, W. Va.—The Keystone Bridge Co., of Pittsburgh, is erecting a new steel bridge across the Tygart's Valley River, at Beverly, Randolph County, on the site of the old wooden bridge, that was burned two years ago. The work has been delayed somewhat by repairs that were necessary to the masonry.

Bowmanville, Ont.—The new bridge at Bowmanville was formally opened last week. The cost of the structure will be about \$12,000, the original contract being \$10,540. The contractor was Robert Weddell, of Trenton Ont.

Fort Myer, Fla.—The County Commissioners are inviting proposals for the construction of a new bridge over Orange Creek.

Golden, B. C.—Canadian Pacific engineers have been engaged in making surveys and estimates for the erec-

tion of new permanent steel bridges to take the place of the temporary ones now in use between Golden and Donald, B. C.

Granite Falls, Minn.—The commissioners of Yellow Medicine and Chippewa Counties are asking for plans and bids for the erection and construction of a bridge across the Minnesota River near Myers station. The bridge will be 193 ft. in length, in two spans—117 and 76 ft.—and will be an iron or combination as the commissioners may elect after examining the plans presented.

Lonaconing, Md.—The superstructure of the new steel bridge to be erected over the Potomac River, at Lonaconing, Md., by the Youngstown Bridge Co. has arrived at the site, and a large force of men are now at work erecting it. It will be completed by Jan. 15.

Minneapolis, Minn.—The Great Northern will let the contract in a few days for the erection of the iron superstructure of a bridge across the west channel of the Mississippi River. The bridge is to replace the wooden one connecting Nicollet island with the west bank of the river. The masonry piers are already completed.

New York City.—The War Department has approved the revised plans for the suspension railroad bridge over the North River at New York City. The plans provide that the bridge shall be 150 ft. above mean tide, or 15 ft. higher than the Brooklyn Bridge. The designs for the bridge have been made by Gustav Lindenthal, of Pittsburgh.

The New York & New Jersey Bridge Co. has purchased ground for the land piers of the proposed railroad bridge over the Hudson River between New York and New Jersey. Thomas C. Clarke is the engineer for this structure.

Parkersburg, W. Va.—The new highway bridges over the Little Kanawha River connecting North and South Parkersburg, which have been under construction since last July, are now well under way. Contractor Jolly expects to have the masonry completed on both piers and approaches by Jan. 10, after which time the superstructure will be put up as rapidly as possible.

Philadelphia, Pa.—The following is a partial list of the bridges to be built on the new Roxborough branch of the Pennsylvania: One 50 ft. long over Rittenhouse street; a 260-ft. span over Township line near the Wissahickon Creek; an ornamental structure over the Wissahickon Creek, 135 ft. high and 564 ft. long. Monastery avenue will be crossed by a bridge 130 ft. long and 75 ft. high. Fairthorne avenue, Crease's lane and Summit avenue will also be bridged. At Barren Hill, a large 60-ft. bridge over 40 ft. high will be built over the Ridge turnpike.

St. Paul, Minn.—The City Engineer has been instructed by the Board of Aldermen to prepare detailed plans and specifications for the construction of a bridge along the line of Grove street to East Seventh street, and along the line of Burr street from Woodward avenue to Grove. The proposed bridge will cross the right of way of the Northern Pacific and Great Northern roads.

Thief River Falls, Minn.—Plans and bids are invited by the commissioners of Polk County, for the construction of a combination or iron bridge across the Red Lake River at this point. The proposed bridge will be 230 ft. in length, in two spans.

Wheeling, W. Va.—On last Thursday the keystone of the large stone bridge over the creek at Main street was set and the arch completed. The event was made the occasion for a small public demonstration. The arch is the largest in the world for its width. The arch is a true segment of a circle, the radius of which is 125.46 ft. The depth of the springers is 6 ft. and the keys 4.2 ft. The weight of the stone in the arch proper is 3,600 tons. There are 85 courses and the stones range in weight from four to seven tons. All cement used in the arch was pure English Portland.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Alabama Great Southern, 3 per cent. on "Class A" stock and 1½ per cent. on "Class B" stock, both payable Dec. 31.

Norwich & Worcester, semi-annual, 4 per cent., payable Jan. 5.

Rio Grande Western, quarterly, 1¼ per cent. on the preferred stock, payable Feb. 1.

Tennessee Coal, Iron & Railroad Co., semi-annual, 4 per cent. on the preferred stock, payable Jan. 15.

Worcester, Nashua & Rochester, semi-annual, \$3 per share, payable Jan. 4.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Addison & Pennsylvania, annual, 49 Broadway, New York City, Jan. 11.

Albemarle & Pamlico, annual, Norfolk, Va., Jan. 18.

Arkansas & Louisiana, annual, Washington, Ark., Jan. 25.

Bellaire, Zanesville & Cincinnati, annual, Woodsfield, O., Jan. 4.

Boston & Lowell, annual, Boston, Mass., Jan. 6.

Brooklyn Elevated, annual, 31 Sands street, Brooklyn, N. Y., Jan. 6.

Cleveland & Pittsburgh, annual, Cleveland, O., Jan. 6.

Columbus, Hocking Valley & Toledo, annual, Columbus, O., Jan. 12.

Kings County (Elevated), annual, 346 Fulton street, Brooklyn, N. Y., Jan. 13.

Little Schuylkill, annual, 410 Walnut street, Philadelphia, Pa., Jan. 13.

Mine Hill & Schuylkill Haven, annual, 119 South Fourth street, Philadelphia, Pa., Jan. 11.

Nesquehoning Valley, annual, 228 South Third street, Philadelphia, Pa., Jan. 11.

New York & Middle Coal Field, annual, 228 South Third street, Philadelphia, Pa., Jan. 12.

New York, Ontario & Western, annual, 18 Exchange Place, New York City, Jan. 20.

North Pennsylvania, annual, 240 South Third street, Philadelphia, Pa., Jan. 13.

Norwich & Worcester, annual, Worcester, Mass., Jan. 13.

Philadelphia & Reading, annual, 227 South Fourth street, Philadelphia, Pa., Jan. 11.

Philadelphia, Wilmington & Baltimore, annual, Wilmington, Del., Jan. 11.

Pittsburgh & Lake Erie, annual, 77 Fourth avenue, Pittsburgh, Pa., Jan. 26.
Pittsburgh, McKeesport & Youghioheny, annual, Pittsburgh, Pa., Jan. 26.
Rome, Watertown & Ogdensburg, annual, 96 Broadway, New York City, Dec. 28.
St. Louis, Vandalia & Terre Haute, annual, Greenville, Ill., Jan. 12.
Terre Haute & Indianapolis, annual, Terre Haute, Ind., Jan. 4.
Terre Haute & Logansport, annual, Terre Haute, Ind., Jan. 4.
Toledo & Ohio Central Extension, annual, Marietta, O., Jan. 11.
Utica & Black River, annual, Grand Central Station, New York City, Dec. 28.
Western & Atlantic, annual, Atlanta, Ga., Jan. 20.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *New York Railroad Club* will hold its next meeting in the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, Jan. 15, commencing at 7:30 o'clock p. m.

The *New England Railroad Club* will hold regular meetings, commencing January, 1892, on the second Monday of each alternate month, at the United States Hotel, Beach street, Boston, Mass.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *Southern Railway Club* holds regular meetings on the third Thursday of the months of January, February, March, May, September and November at such points as are selected at each meeting.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwestern Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m. in the directors' room of the St. Paul Union Station.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesday in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday of each month. The annual meeting is held on the third Saturday in January. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursday at 8 p. m. The Association headquarters are at Nos. 63 and 65 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Association of Civil Engineers of Dallas* meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 o'clock p. m. on the first Friday of each month.

New York Railroad Club.

A regular monthly meeting was held at the rooms of the American Railway Association, New York City, Dec. 17, at 2 o'clock p. m., President Blackall in the chair. Fifteen members were elected.

A paper was read by Mr. W. G. Berg, Principal Assistant Engineer, Lehigh Valley Railroad, on Coaling Stations for Locomotives. Mr. Berg was followed by Mr. H. A. Ainsworth, President, Williams, White & Co., who described the Clifton chute. There was a brief discussion, during which a letter from Mr. A. J. Swift, Chief Engineer, Delaware & Hudson Canal Co., was read, speaking very highly of the Clifton chute in service on that road.

The subject for the next monthly meeting will be the Care and Maintenance of Air Brakes in Freight Service, and the meeting will be held at 7:30 p. m., the third Thursday in January, at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first

street, New York City. A collation will be served after the adjournment of the meeting.

Mr. Ennis, Master Mechanic, New York, Susquehanna & Western, brought up the question as to whether or not there should be a labor charge made for putting on a brakeshoe or putting in a brass on a foreign car. The following resolution was adopted: That there should be no labor charge made for putting on a brakeshoe or putting in a brass in a foreign car, and that a modification to this effect should be made in Rule 8 of the interchange rules. It was also voted that other railroad clubs should be notified of this action of the New York Railroad Club.

The Engineers' Club of Philadelphia.

At the meeting held on Dec. 5 the following nominations were made for officers for 1892: For President, James Christie; for Vice-Presidents, F. H. Lewis, Howard Murphy, Pedro G. Salom; for Secretary, John C. Trautwine, Jr.; for Treasurer, T. Carpenter Smith; for Directors, John E. Codman, George V. Cresson, Strickland L. Kneass, Wilfred Lewis, M. Richards Mucklé, Jr., H. W. Spangler, David Townsend.

The Committee appointed to consider the question of land-locked navigation through the bays and inlets of the Atlantic and Gulf coasts, and to communicate with the boards of trade and other commercial bodies of the eastern and southern seaboard cities made a report.

Mr. F. H. Lewis' Specifications for Bridge Superstructure, which were submitted at the meeting of Oct. 17, were discussed by written papers received from Messrs. W. H. Burr, Palmer C. Ricketts and Alfred E. Hunt.

Mr. Burr believed that the specifications were unnecessarily explicit. The practice of placing stringers on top of the floor beams, the requirement that legs of trestles must be so inclined as to avoid tension on the windward side of the viaduct, and the limiting of the size of steel bars to 8 in. x 2 in. were criticised. Mr. Burr commended the specifications covering the use of steel. His experience had convinced him that the grade of metal called by Mr. Lewis "soft steel" can be properly treated like iron in all the shop manipulations of punching, shearing and riveting.

Mr. Ricketts believed that it was hardly advisable for all railroads to insist upon the use of steel for all web plates, or to specify that stringer beds must be of cast iron. Nine feet was an unnecessarily wide spacing for stringers in single track through bridges, and a spacing of 7 ft. is equally safe; spans between 100 and 120 ft. lattice bridges were as safe, as rigid and as good as pin-connected trusses. Mr. Ricketts questioned the advisability of requiring an increase in the allowance for wind-pressure per lineal foot in spans over 200 ft., and a distinction should be made between loaded and unloaded bridges in this respect. Other features criticised by Mr. Ricketts were the provision for cross-ties resting directly on bottom chords; the allowance for the weight of full sized chord compression members in the use of the formulae for long columns; the compulsory use of equal-legged angles between stringers and floor beams; the clause relating to stiffeners; the requirement that splices in heavy members should break joints with each other; the compulsory use of vertical web members in all lattice bridges; and the requirement that bars in double as well as in single latticing must make angles of 60 degrees with the axis of the piece.

Mr. Hunt suggested 60,000 to 68,000 lbs. tensile instead of 70,000 for medium steel, and urged a requirement respecting the appearance of fracture for both medium and soft steel; also the drifting test for both steels. He did not think that a formula modeled after that of the Standard Bridge Builders' specifications should be required to be used by the subordinate officers of manufacturing concerns. The requirement of 18 per cent. elongation in 8 in. is too severe. He would accept ordinary bar iron which stood 48,000 tensile with 16 per cent. elongation, provided the fracture was fibrous. Sheet aluminum used in place of sheet lead for bearings has the advantages that it takes a square bearing, does not flow as much as lead, and will not oxidize or corrode. Bulk for bulk, the cost of aluminum is now very close to that of lead. He would not reject medium steel for solid rolled beams. In the Pittsburgh district the difficulty in producing good iron has been aggravated recently by the irregularity in the supply of natural gas.

The Secretary read a paper by Mr. George R. Ide on "Smoke Abatement in Cities." Great care is required with any system of hand-firing, to prevent smoke forming; much more than can usually be exercised. The coking system is as old as 1800, when a patent was granted in England for such a system. In the United States there have been probably 1,000 patents granted for contrivances of this nature. Many of these are successful in preventing smoke forming in objectionable quantities. The principal reason why a more general use is not made of these devices is their first cost and the fact that some one else is inconvenienced. The report of the Smoke Abatement Committee in 1882 shows that by the use of improved designs of furnaces and methods of operating them the smoke nuisance may be practically done away with, and that the use of mechanical stokers is of the greatest importance in producing this result. The abatement of the smoke nuisance, so far as steam boilers are concerned, does not depend upon the possibility of designing suitable new appliances, but upon that of inducing proprietors to use the appliances long since designed. The subject was discussed by Messrs. George S. Strong, Max Livingston, H. W. Spangler and T. Carpenter Smith, members, and by Messrs. John D. Baltz and Walter C. Kerr, visitors.

Mr. Strong believed that the public was not yet educated up to the conviction that smoke prevention was a possibility. When fire-bridge walls are provided with openings in the back, these soon become clogged with slag. Air must be supplied under the grate. Mr. Livingston thought that smoke prevention cost more than it came to. The proper remedy is first to convert the soft coal into gas, and then burn the gas. Mr. Kerr said that mechanical stokers may be manipulated so as to prevent the emission of smoke. In Chicago the difficulty lay in the low setting of the boilers put up in past years, and the consequent difficulty in introducing sufficient air below the grates, the water in the ground preventing the introduction of proper air ducts below the boilers. The successful devices depend upon the supply of a great surplus of air, which, of course, means mere dilution of the smoke, and must be accompanied by a loss of efficiency, and this has brought smoke consuming devices, as a class, into disrepute.

Mr. Smith had had some experience with mechanical stokers of the continuous chain grate pattern. They reduced the smoke, but were found costly in repairs, and were abandoned. He referred to the use of deep copper fireboxes and of fire bridges on English and Scotch locomotives.

Mr. Kerr thought that such devices were useful on loco-

motives, but could not be applied to stationary engines. In locomotives the bridge reduces the excess of draught. In stationary engines there is a deficiency of draught to start with.

Mr. Morris referred to the work of Charles Y. Williams, published in 1842, as containing pretty much all that is known to-day on the subject, and which summed up the matter in the conclusion that smoke prevention does not pay.

At the meeting on Dec. 19 President Wilfred Lewis was in the chair and about 60 persons were present.

It was directed that a committee of nine members, none of whom shall be directors, be appointed to report upon the best means of developing the social feature of the club. On motion of Mr. H. Murphy it was made a rule of the club that papers received from non-members shall not be printed, in full or in abstract, in advance of their presentation at a meeting, but may be announced by title only. Mr. E. V. d'Inville submitted a proposed amendment to the by-laws providing for the appointment by the chair of a nominating committee. The Secretary read a letter from Mr. Howard Murphy, declining his nomination to the Vice-Presidency of the club.

The Secretary read a paper by Mr. W. W. Thayer, accompanied by a large-scale plan, describing a route for the proposed boulevard from the City Hall (or "Public Buildings") to Fairmount Park, Philadelphia. The location of the boulevard is a straight line from the northwest corner of the City Hall to the southwest corner of Fairmount reservoir, and its cross section should be not less than 150 and preferably 160 ft. wide. The length of the proposed avenue is one and one-sixteenth miles, and the estimated cost about six million dollars, of which \$5,624,000 is for property condemned. Prof. L. M. Haupt referred to the projects for such an avenue which had been discussed some 20 years ago, and urged the great desirability of such an improvement. He preferred, however, a line starting from the North Broad Street front of the City Hall, rather than from its northwest corner, as being shorter and cheaper.

The Secretary read, for Prof. H. W. Spangler, an account of a series of tests upon $\frac{1}{2}$ in. round rolled iron bars. Ten such bars were taken, and each bar was cut into lengths of about 16 in. each. The first set was tested as it was cut from the bar, and averaged 34,545 lbs. elastic limit and 51,097 lbs. ultimate strength. The second set was annealed, and the third was heated to a welding heat and cooled on the floor. The fourth set was upset to $\frac{1}{2}$ in. diameter by $2\frac{1}{2}$ in. long. The next set had ends welded on. Another set was cut in two and welded together. Part of another set was prepared in the same way and annealed, and the balance of this set was headed. The last set was also headed in the machine on which the upsetting had been done. The tests show that heating to welding heat and allowing to cool reduced the tenacity 4 per cent., and increased the elongation about 16 per cent. Heating to a cherry red and annealing increased the elongation without reducing the average tensile strength. Upset ends are probably as strong as the original bar. The welded pieces had the same elastic limit as the original bar, but were otherwise greatly inferior, the average tensile strength being about 85 per cent. Annealing had no effect. Headed bars, if without flaws, are as strong as the original bars, but 20 per cent. of the heads were defective.

Mr. Jacques W. Redway presented an elaborate paper upon the "Practical Projection and Construction of Maps," and gave a brief oral description of its salient features. He described briefly the orthographic, stereographic and equidistant projections of the hemisphere, expressing his personal preference for the stereographic. For the projection of small areas the development of the sphere on a cone was the most practicable and feasible way of constructing a map. The development of Bonne's and Flamsteed's projections from the simple cone, and the more complex polyconic projection employed in the United States and British Coast Surveys were considered. The author emphasized the importance, in depicting the details of maps, of giving to the map such character that the physical geography of the area could be read from its lines.

Owing to the lateness of the hour, a description by Mr. Emile Low of a large landslide in Virginia and a further discussion by Mr. F. H. Lewis of his specifications for bridge superstructure were deferred and the meeting adjourned.

Western Railway Club.

The last meeting of the Western Railway Club consisted of a trip to the World's Fair grounds. A special train furnished by the Illinois Central road was switched through the Fair grounds between the buildings in such a way as to give the members of the club a chance to see the details of construction. The trip was a very instructive one for the railroad men present, as in no other way could they obtain such a good idea of what is going on at the World's Fair grounds. The progress there is phenomenal. Out of a swamp has grown a city of buildings of enormous size. Some of the largest buildings are completed to the roof, and the staff work is now being put on. The meeting was well attended, and the trip was a successful one in spite of the rainy weather.

PERSONAL.

—Mr. Charles P. Brotherton has been appointed General Manager of the Kansas City, Wyandotte & Northwestern, to succeed Mr. E. Summerfield, resigned, who has held that office since the appointment of a Receiver. He was previously Superintendent of the road.

—Mr. R. B. Williams, Superintendent of the New York & New England, has resigned that position and has been succeeded by Mr. F. E. Dewey. Mr. Williams was formerly Trainmaster of the West Shore at Weehawken, and was appointed Superintendent of the Springfield and Western divisions of the New England road last January.

—Mr. N. W. Sample, Superintendent of Machinery and Rolling Stock on the Denver & Rio Grande, is to be appointed General Superintendent of that road, in addition to the duties of his present position. Mr. J. J. Burns, now Acting Superintendent, will be appointed Superintendent of the first division, while continuing Superintendent of Telegraph.

—Mr. F. W. Buskirk, at present City Passenger Agent of the Pennsylvania lines in Cincinnati, will succeed Mr. D. I. Roberts as Assistant General Passenger Agent of the Erie lines, with headquarters in Chicago. Mr. Buskirk was formerly General Western Agent of the Chesapeake & Ohio, and was appointed City Passenger Agent of the Pennsylvania at Cincinnati when Mr. Roberts resigned that office to connect himself with the Chicago & Erie.

—Mr. Cecil Gabbett, it is reported, has been appointed Superintendent of the Charlotte, Columbia & Augusta and Columbia & Greenville divisions of the Richmond & Danville. Mr. Gabbett succeeds Mr. J. A. Dodson, who has been made Superintendent of the Atlanta & Charlotte Air Line and Macon & Northern divisions of the same line. Mr. Dodson succeeds Mr. C. P. Hammond, who has resigned. Mr. Gabbett was General Manager of the Central of Georgia when it was turned over to the Richmond & Danville for operation, and he resigned soon after.

ELECTIONS AND APPOINTMENTS.

Alabama Great Southern.—The stockholders met at Birmingham, Ala., Dec. 16. The following Board of Directors was elected: Samuel Thomas, John H. Inman, John G. Moore, Calvin S. Brice and John A. Ruthenford, New York; Samuel M. Felton, C. C. Harvey, Cincinnati; Charles McGhee, Knoxville; T. G. Bush, Aniston, Ala., and Francis Pavey, London.

Atchison, Topeka & Santa Fe.—W. J. Black has been promoted from Chief Clerk of the Ticket Department to be Assistant General Passenger and Ticket Agent, effective Jan. 1.

William Bennett, a conductor on the Southern Pacific in Texas, has been appointed Division Superintendent of the Chicago, Santa Fe & California, with headquarters at Macellin, Ia.

Baltimore & Ohio.—Frank R. Patton, formerly Superintendent of the Potts Iron Co., at Wyebrook, Pa., has been appointed Assistant Engineer in the Maintenance of Way Department, at Pittsburgh, under Division Engineer Elwell.

Calumet & Blue Island.—C. J. Clifford has been appointed Master Mechanic of this company, in charge of locomotive and car departments, with office at South Chicago, Ill.

Chicago & Erie.—G. A. Coe has been appointed Assistant Superintendent of the Western Division, with headquarters at Chicago.

Chicago, Rock Island & Pacific.—J. H. Martin, formerly Division Passenger Agent of the Cleveland, Cincinnati, Chicago & St. Louis, at Indianapolis, has been appointed District Passenger Agent of this road, with headquarters at St. Paul, succeeding R. R. Randall, transferred to St. Louis.

Chicago & South Eastern.—The jurisdiction of C. J. Clifford, Master Mechanic of the Calumet & Blue Island road, has been extended over the locomotive and car departments of the above company, and of the Chicago & Kenosha and Joliet & Blue Island, with office at South Chicago, Ill.

Cleveland, Cincinnati, Chicago & St. Louis.—The following appointments were announced this week: A. G. Wells, to be Superintendent of the St. Louis division; C. J. Stedwell, Superintendent of the Indianapolis division; T. J. Higgins, Superintendent of the Cleveland division; C. S. Rhoads, Superintendent of Telegraph. These changes have followed the resignation of J. Q. Van Winkle, Superintendent of the St. Louis division, to become Superintendent of the Terminal Railroad Association of St. Louis. C. J. Stedwell has been Superintendent of the Cleveland division and A. G. Wells of the Indianapolis division.

Great Northwest Central.—P. A. Bogue, formerly the Canadian Pacific agent at Brandon, Man., has been appointed Traffic Manager of this new road, with headquarters at Charter, Man.

Hartford & Connecticut Western.—The annual meeting was held at Hartford, Conn., Dec. 16. The directors elected are: Henry Gay, West Winsted, Conn.; H. A. Botsford, Hartford, Conn.; J. O. Phelps, Simsbury; E. W. Spurr, Falls Village; Frederick Miles, Chapinville; J. H. Appleton, Springfield; H. O. Seixas and John S. Wilson, New York, and W. W. Gibbs, W. B. Scott, C. Tower, Jr., John W. Brock and Arthur E. Newbold, Philadelphia.

Illinois Central.—John T. McBride, Superintendent of Northern Pacific's terminal lines, Chicago, has been appointed Local Freight Agent of this road, vice Horace Baker, who has been promoted to the superintendency of the Cairo division.

W. H. Fitzpatrick, Trainmaster of the division between New Orleans and McComb, Miss., has been transferred to New Orleans to be Superintendent of Terminals there.

Mexican Central.—F. S. Anable, Comptroller of the Cincinnati, Jackson & Mackinaw, has resigned to accept the office of General Auditor of this company. His headquarters will be in Boston.

Milwaukee, Lake Shore & Western.—At a meeting of the directors of the company in New York Dec. 17 Marvin Hughtitt and M. L. Sykes were elected directors to fill existing vacancies.

Missouri Southeastern.—The following are the officers of this company, recently chartered: President and General Manager, Geo. H. Crumb; Secretary, Manning S. Phelan, and Chief Engineer, C. W. McCrea. The general offices are at Bloomfield, Mo.

Mount Hily, Lumberton & Medford.—At the annual meeting of the company, in Philadelphia, Henry I. Budd was elected President, Clifford Stanley Sims, Vice President, and Isaac W. Stokes, Secretary and Treasurer.

Natchez, Red River & Texas.—The following directors were elected at the annual meeting at Natchez, Miss., Dec. 18: George W. Debevoise, C. H. Stone, W. H. Murphy and Hugh Porter, of New York City; Louis Botto and S. E. Rumble, of Natchez, and C. A. Gardner, of Vidalia, La. The following officers were elected: President and Treasurer, Hugh Porter; Vice-President and General Manager, C. A. Gardner, of Vidalia, and Secretary, W. H. Murphy, of New York.

New York & Canadian Pacific.—At an election held Dec. 15 at 71 State street, Albany, N. Y., the following were chosen directors: Joseph H. Ramsey, Jacob G. Runkel, Minard Hardee, Henry Russell, John W. McNamara, Conrad J. Crouse, John W. Van Valkenburgh, John W. Whitbeck, William S. Carman, H. B. Whitcomb, Charles S. Ramsey, Jacob Lefevre and William L. M. Phelps.

New York, Lake Erie & Western.—C. W. Dechant, formerly Engineer and Superintendent of the Mount Tenu gravity road, has been appointed Engineer in

charge of relocation and improvements east of Corry, Pa.

North & South of Illinois.—The stockholders of this company, formerly the St. Louis & Chicago, at a meeting held in Springfield, Ill., Dec. 22, elected the following Board of Directors: Gerald L. Hoyt, D. D. Withers, A. Bryson, Jr., New York; C. H. Bosworth, John M. Bunn and James L. Cook, Springfield, and H. W. Dana, Lincoln, Ill.

Pullman's Palace Car Co.—F. E. Hilton, District Superintendent at Long Island City, has been transferred to Louisville, to succeed George M. Fletcher, who has been Superintendent at that point for 13 years.

Richmond & West Point Terminal.—At a meeting of the directors in New York Dec. 21 William E. Strong, of the firm of Work, Strong & Co., of New York, was elected a director in place of A. J. Rauh, resigned. Mr. Rauh was elected to the board in Richmond on Dec. 8.

Roanoke, Fincastle & Clifton Forge.—Charles H. Vines, of Fincastle, Va., has been elected President and John Ross, Vice-President.

Sea View (Brooklyn).—The following directors and officers were elected at the annual meeting, Dec. 17: I. M. Bon, Felix Campbell, Joseph Fahys, A. R. Johnson, Jesse Johnson, James Jourdan, E. L. Langford, H. C. Mangles, J. L. Morrow, F. A. Schroeder, Alonzo Slot, D. H. Valentine and H. von Deilen. F. A. Schroeder was elected President; J. L. Morrow, Superintendent and Secretary, and I. M. Bon, Treasurer.

Somerset.—The company, at its annual meeting in Oakland, Me., last week, re-elected the old Board of Directors. The directors have chosen the following officers: John Ayer, President; R. Wesley Dunn, Vice President; A. R. Small, Treasurer and Clerk; W. M. Ayer, Superintendent.

Springfield, Yellville & White River.—The following are the incorporators: Edward H. Webster, Kansas City, Mo., President; William R. Jones, Yellville, Ark., Secretary; W. Holman, Yellville, Treasurer; Otis C. Hadley and Frank O. Hadley, Kansas City; Clarence E. Pond, Yellville, and Hempstead Dodd, of Dodd City, Ark.

Washington & Chesapeake Beach.—The following officers and directors were elected at a meeting at Washington, D. C., on Dec. 19: Henan D. Walbridge, President; B. F. Karns, Vice-President; T. W. Tyrer, Secretary and Manager; John G. Slater, Treasurer; General Counsel, A. H. Garland, ex-Attorney General of the United States. Directors: Edwin Warfield, Frederick H. Smith, and W. C. Codd, Baltimore; C. C. Magruder, Upper Marlborough, Md.; H. D. Walbridge, B. F. Karns and John G. Slater, of Washington.

West Florida & Atlantic.—The following are the incorporators: J. G. Fuller, Roswell Shinn, John E. Calley, Chicago; E. S. Lawrence, South Spafford, N. Y.; J. D. Pirroug, Wewahatchka, Fla.; John Barr Glenn, Chipley, Fla., and J. D. Martin, St. Andrews, Fla.

York Harbor & Beach.—The stockholders have re-elected the following Board of Directors: Frank Jones, Portsmouth, N. H.; G. C. Lord, Portland, Me.; J. C. Ricker, Deering, Me.; S. C. Lawrence, Medford, Mass.; E. S. Marshall, H. E. Evans and J. E. Staples, York, Me. The directors organized by choosing Frank Jones President and S. W. Jenkins, Clerk.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Alabama Grand Trunk.—The contract will probably be let this week, or early in January, for grading the first 10 miles north of Montgomery, Ala. The company expects to have the contracts let for the 30 miles through Elmore County to Equality in Coosa County soon after the commencement of the work near Montgomery. The charter of the company passed by the last state legislature secured to it an appropriation by the state sufficient to grade the first 10 miles. The right of way through Montgomery has already been granted by the city council from the northern corporation limits into the union station, and other valuable franchises and concessions have been secured from several counties. No effort has been made to place any mortgage bonds, but the company has secured funds for grading 30 miles of the road and the piers for a 400-ft. bridge over the Tallapoosa River, and proposes to dispose of its first mortgage bonds to complete this section. H. G. McCall, of Montgomery, is President.

Alloway & Quinton.—This branch of the Pennsylvania West Jersey line was opened for traffic Dec. 21, but it has been practically completed over a month. The new branch is five miles long, extending from a point above Alloway on the Salem road southwesterly to the terminus, a manufacturing town of considerable size. The route is through a pine region and the idea in building the road has been partly to give railroad connections to the hotels.

Bellingham Bay & Eastern.—This company has recently been organized in Washington to build the projected branch to the mines of the Blue Canyon Coal Company in Bellingham County. The road will be a branch of the Seattle, Lake Shore & Eastern, about nine miles long, from a point near Ray Station, northwest along the north shore of Lake Whatcom to the coal mines. Peter Larsen, S. T. Hausen, J. J. Donovan and others of Fairhaven, Wash., are the incorporators.

Bridgeport & Decatur.—Morris B. Locke, who has the contract for completing the construction of the road, states that work will be resumed shortly, and he expects to have it completed from Decatur southwest to Bridgeport, Texas, a distance of 12 miles, in a few weeks. The road was partly graded between these points early in the year.

Canadian Roads.—Application will be made to Parliament next session for an act to incorporate a company to build a line from Carp, in Carleton County, connecting with the projected Ottawa & Arnprior road, and extending southeast through Almonte, Lanark and to Sharbot Lake to a connection with the Kingston & Pembroke road, a total distance of 50 miles. Also a company to build a railroad from a point on the Columbia River, near the boundary of British Columbia, to Kootenai Lake, near Nelson, B. C.

Charleston, Clendenin & Sutton.—Contracts are reported to have been let for the first 35 miles of this line along the Elk River, from Charleston, Va., northeasterly

to the Clay County line. The locating survey was made for this section of the line during the fall and preliminary surveys have been made for 50 miles along the Elk River to Sutton in Braxton County, the present terminus of the West Virginia & Pittsburgh line.

Chesapeake & Ohio.—Contracts have recently been awarded for a four-mile extension of the branch on the south side of the New River in West Virginia, and for a five-mile branch up Keeney Creek, on the Huntington division; also for double tracking the road between Low Moor and Covington, Va., eight miles.

Chicago, Rock Island & Pacific.—One of the engineering parties making a new survey south of Minco Junction, I. T., is reported to have run a line as far south as Rush Springs, I. T., about 70 miles northwest of Gainesville, Tex., and 50 miles south of Minco, which is at present the terminus of the Southwestern Division.

Des Moines & Northwestern.—An effort is being made to secure an extension from Boone north to Mason City, Ia., 86 miles. The officers of the road are anxious to make the extension and will do so if they receive the right of way and sufficient stock subscriptions.

Duluth, Mesabi & Northern.—The proposed contract with Donald Grant & Co., of Faribault, Minn., is said to have been finally agreed upon and the firm of Foley Bros. & Guthrie, of St. Paul, will build the line. They are said to have received from C. C. Merritt, K. D. Chase and other projectors of the road a large interest in the Mountain and Bewellick Iron companies. The iron mines of these companies are in the Mesabi range of mountains in the northern part of Minnesota, near the boundary line, and the road is to be built to them from a connection with the Duluth & Winnipeg near the St. Louis River, some distance west of Duluth.

Duluth & Winnipeg.—The three miles of grading between the line of the Eastern Minnesota and the St. Louis River near Duluth, on the Wisconsin side, will, it is expected be finished this week. Preliminary work on the bridge has begun.

Elgin, Joliet & Eastern.—The branch line through the city of Aurora, Ill., to the new station of the company, was used Dec. 21 for the first time for passenger trains, although the work on the new road has been practically completed for several months. The new line is only 1½ miles long, but in that distance there are several railroad crossings, including at one point five tracks of the Chicago, Burlington & Quincy.

Florida, Georgia & Carolina.—A bill has been introduced in the South Carolina Legislature chartering the company previously chartered in North Carolina, with W. A. Gaines, of Mt. Carmel; J. Fuller Lyon, W. L. Mauldin and others as incorporators. The company is authorized to build a railroad from the Savannah River near Mt. Carmel via Abbeville and Greenville to the North Carolina State line.

Gainesville, La. Crosse & Lake Butler.—This company filed a charter in Florida last week. It proposes to construct a road from Gainesville to Lake Butler, in Bradford County, and from Gainesville southward, through the counties of Alachua, Marion, Levy, Citrus, Hernando, Pasco and Hillsborough to Tampa Bay, a distance of 225 miles. Charles L. Fildes, John S. Twoomey, John R. Eddins, G. W. Hyde and I. E. Webster, all of Gainesville, Fla., are the incorporators.

Georgetown & Granger.—The tracklaying between Georgetown and Granger, Tex., 10 miles, having been recently completed, the line was transferred last week by Contractor Hughes, of Fort Worth, to the local company. The road will not be operated until the line is taken over by the Missouri, Kansas & Texas, which made an agreement to operate it, when its construction was begun.

Grand Rapids & Indiana.—President Hughart says: We are contemplating the extension of the road about 50 miles northward from Manistee, Mich., which will open up some fine country. Many improvements have been made along the line this year, and I think the extension will be commenced early in the spring.

Great Northern.—Chief Engineer E. H. Beckler has made a very complete statement of the work so far accomplished in the construction of the Pacific Coast extension. Mr. Beckler began the through survey in the fall of 1890. Previous to this Major Rogers had in 1886 and 1887 made a survey from the Montana Central line down the Big Blackfoot River to Missoula, Mont., and thence over the Shoshone Pass in the Cadotte Mountains, and down the Cadotte River to Spokane, thence through Waterville and Wenatchee and through the Cady Pass in the Rocky Mountains and down the Skyhomish River to the Pacific Coast. This route had many heavy grades, and the company desired a route with easier grades. Considerable time was spent in the winter of 1889 and 1890 making new surveys, the progress being necessarily slow, as the mountains were covered with snow. This delayed the construction, so that it was about Aug. 1, before the company was assured that the best line had been found, and that they could go ahead without mistake. The first contract was let on Aug. 1, 1890, to Shepherd, Seims & Co., of St. Paul, for the work from the Montana extension of the St. Paul, Minneapolis & Manitoba to the summit of the Rocky Mountains, a distance of 166 miles. The tracklaying was begun on Oct. 20, and between that time and Jan. 20, 125 miles of track was laid, making the winter terminus at Cut Bank River, where the first large delay to construction, in the shape of the bridge, 1,200 ft. long and 145 ft. high, was met. This bridge was built in February and March, and tracklaying was resumed on April 25, 1891, and pushed rapidly forward until again stopped by the construction of the second Medicine bridge, a structure 800 ft. long and 212 ft. high. Tracklaying was suspended for two months, and since that day has been going steadily forward, stopping occasionally for the construction of some small trestles along the mountain sides, until now it has reached the Flathead valley, 29 miles from Kalispell, Mont., a new railroad town which was founded May last. During all the past season a large grading force has been kept advancing work as fast as definite locations have been prepared by the engineers, so that at the present time, excepting for the construction of a few bridges, work has been completed to Albany Falls, at the crossing of the Pend d'Oreille River, four miles east of the Washington state line. From the Rocky Mountains west as far as the State of Washington there are heavy bridges, and the line follows the valleys of streams with very easy grades and light curves. East of the Rocky Mountains the line reaches

the summit with no grades exceeding one per cent, and crossing the summit without a tunnel. This grade is about one-half as steep as that of any other transcontinental line. The crossing of the Pend d'Oreille River is made with two steel bridges, with 300 and 100 ft. spans respectively. These are now being built by the Wisconsin Bridge Co., and will be erected in February and March, so that the track need not be delayed when it reaches that point. The examination of the passes in the Cascade range was begun as soon as the melting snow would permit in the spring of 1890, and a large force of engineers have been constantly employed since that time, except for a few months last winter when the ranges were impassable, seeking for the most favorable pass. All the known passes and several new ones were examined. The choice finally fell upon Stevens Pass, which gave the most favorable approaches from the east and the west with easy grades by using a tunnel of about the same length as that built by the Northern Pacific at Stampede Pass, about 30 miles south. The line where it crosses the Big Bend country has not received much attention until recently, as it was thought to be a country easily traversed. It is expected that within a few weeks, or possibly by the time the work can proceed in the spring, that this part of the line can be definitely located. It was very quickly discovered that Spokane would be off the most direct route, a number of miles to the south, but a branch may be built to the town. The difficulties in getting in and out of the town without introducing grades which would be steeper than those used in other parts of the line made the problem almost too great to be solved. Surveys have been going on quietly, and it is expected that a conclusion will be reached pretty soon.

Iberia & Vermilion.—The Town Council of Abbeville, La., has ordered an election for Jan. 25, for the purpose of voting a five mill tax for the construction of this road, which, when built, will be operated as a branch of the Southern Pacific between New Iberia and Abbeville. August Erath, of New Iberia, is President of the local company.

Johnsonburg & Bradford.—The letting of the contract for this road was noted last week. The following information is from one of the officers of the company: The line has been surveyed several times in this and previous years, the engineers having gone over the line last month. It will extend from Howard Junction, seven miles south of Bradford, Pa., to Mt. Jewett, Pa., passing around the head waters of Kinzua Creek. It is 20 miles long. The contract for grading and masonry has been let to Brendlinger, Nearing & Kelly, Central Building, Liberty street, New York City. The firm will begin work immediately. The grading averages about 30,000 yards to the mile. There are several heavy rock cuts. The grades are all light and the curvature easy. There are no bridges or tunnels on the line. When completed, the road will be operated by the Buffalo, Rochester & Pittsburgh. J. M. Floesch, of Bradford, Pa., is Chief Engineer, and W. E. Hoyt, of Rochester, N. Y., is Consulting Engineer.

Kingston, Napanee & Western.—The engineers have completed a survey for the extension of the line from Tweed, Que., the present terminus, north about five miles to form a junction with the branch of the Grand Trunk now in operation between Bridgewater and Madoc, Ind.

Macon, Dublin & Savannah.—The company will issue first mortgage bonds on the 55 miles of road completed west of Macon at about \$20,000 per mile to obtain funds for either building from Dublin east to Savannah or the purchase of the Macon & Atlantic Railroad.

Maine Central.—About 100 of the company's men are at work grading and preparing for building a second track between Augusta and Gardiner, Me., four miles.

Manistee & Grand Rapids.—The extension south of Manistee, Mich., has been completed for 13 miles from the crossing of the Big Sauble River southeast toward Luther, Mich. The track is now being laid to the crossing of the Chicago & West Michigan near Baldwin, Mich. The grading has been nearly completed on this four miles and most of the track, and probably all will be laid before Jan. 1. The road has been located to Luther, Mich., about 10 miles beyond the end of the track, and surveys have been made to Grand Rapids, 84 miles further south.

Mankato & Northeastern.—The citizens and business men of Mankato, Minn., have decided to build this line, which has just been chartered in Minnesota, as noted last week, from Mankato northeast about 65 miles to Hastings, Minn., on the Minnesota River, where it will connect with the Chicago, St. Paul & Kansas City and the Chicago, Burlington & Northern. It will also connect with the Chicago, Milwaukee & St. Paul at Farmington. The incorporators are J. G. Fowler, D. W. Selleck, John Klein, A. B. Smith, J. D. Quane, Byron Hughes, J. G. Koller, D. L. Rose, P. Fallsman, Henry Rubel and others. A meeting will be held at Mankato on Dec. 29 for the election of directors.

Mexican International.—W. T. Robertson, who has the contract for building the road from Torreon south to Durango, Mex., reports the work progressing favorably; that 40 miles of the grading has been completed, and is ready for the ties. Tracklaying will begin about Jan. 1, and will continue until the road is completed to Durango. The most difficult portion of the grading has been completed, the rest of the line being over a comparatively level country, so that the grading is not likely to interfere with the tracklaying when it is begun.

Mexican National Construction Co.—The only important new work now being done on the Coluna Division of this company's lines is the filling of a trestle across the Laguna de Cuyutlan at the Port of Manzanillo. This trestle is 1,460 metres long and requires about 85,000 cubic metres of embankment. Two trains of 15 cars each with ballast unloaders are used on the work, which is averaging about 575 cubic metres per day, with 60 men at 50 cents a day, loading cars. The material is sand. In October of last year seven kilometres of the Coluna line, distributed in a distance of 31 kilometres, was washed out. The damage was not repaired until this spring, when the reconstruction was commenced on Feb. 16, and the line opened for traffic on April 15. About 50,000 cubic metres of material were moved, 330 lineal metres of wooden bridges erected and 7,100 lineal metres of track laid. One and one-half kilometres of the line were relocated and the balance rebuilt on the old location. There continues to be much talk of work being begun on the extension of this line to Guadalajara, Mex., but nothing positive can be reported on the subject.

Mexican Roads.—A concession has been granted to Rafael Borantes to construct, without subvention, two

lines, one between Ermita and the town of Teapa, in the State of Tabasco, and the second from Paraiso to Cunduacan, also in Tabasco. The latter may be extended as far as the Dos Bocas or Chiltepec bar, on the Pacific sea coast.

Michigan Roads.—Among the railroad companies which have recently filed charters in Michigan are the Jackson & Northern, with a capital stock of \$12,000; the Crystal Lake Railroad, with a capital stock of \$75,000, and the Detroit, Springwell & Dearborn, with a capital stock of \$100,000.

Middle Georgia & Atlantic.—Tracklaying will begin immediately on the graded section of the line between Machen and Covington, Ga., a distance of 24 miles, and this work completed in the spring. Construction may then be commenced on the Savannah extension between Savannah and Statesboro, Ga. The latter town is as far west as the line has been located.

Missouri Southeastern.—The contracts have already been let for part of the work of this company recently chartered to build a short road at Bloomfield, Mo. Most of the construction work, however, will probably be done by the company. The work is light, with very little rock. The maximum grades are less than one per cent., and the maximum curve is four degrees, except one of seven degrees to connect with the St. Louis Southwestern line. The new road will practically be a feeder of the St. Louis Southwestern, connecting with it about 17 miles southwest of Delta, Mo., and extending west to the Caslor River and south to Bloomfield. The road will probably be opened next May, the principal traffic being timber. The money to build the line has been secured.

Mount Nebo.—The project for a railroad from Dardanelle, Ark., and the incline up Mount Nebo seems likely to be carried out early next year. The town of Dardanelle has granted a bonus and franchises requested by the projectors of the line, and a new company will probably be organized for constructing the road. The route which has been already surveyed is from a connection near Dardanelle with the White & Black River road, whose officers are interested in the new project, and extending westerly $5\frac{1}{2}$ miles to the base of the mountain, which is to be ascended by an incline about 3,000 ft., long operated by cable or electric traction.

Nashville & Clarksville.—Wm. Morrow, J. M. Anderson, Frank M. Morrow, J. E. Goodwin and J. Spencer McHenry have made application for a charter for a company in Tennessee. The purpose is to build a road from the present terminus of the West Nashville branch of the Nashville, Chattanooga & St. Louis in Davidson County, to Clarksville, in Montgomery County.

Northern Pacific.—The track has been laid into Ocoosa, Wash., on the extension of the Tacoma, Olympia & Gray's Harbor road, completing the line from the connection with the Pacific Coast division and from Olympia to Gray's Harbor on the Pacific Coast. About 25 miles of track has been laid on this line this year west of Montesano, Wash. About 30 miles of track has been laid altogether on other parts of the new branches of the Northern Pacific in Western Washington. The track has been laid into Elma, east of Montesano, from a point 26 miles west of Centralia. The line to Gate City is also about ready for operation, the track having been laid into that town this year from a point 22 miles west of Lakeview, near Olympia.

Ohio River.—This company has begun work upon its independent line into Huntington, W. Va., under privileges granted by the City Council early this year. Heretofore the road entered the city over a leased line. The new line will be about eight miles long and will include a bridge over the Guyandotte River. The contract for the grading has been let to James A. Hughes and work has been commenced with 50 teams above the Guyandotte River. The work on the bridge will soon be begun and the track laid to it, and when it is completed the contractor will transfer his forces to the south side of the river. A new station depot will be built at Tenth street and Second avenue, into which the trains of the Newport News & Mississippi Valley Co. will also run. Freight trains will be run into Huntington over that line instead of being turned at Ashland, Ky., as is now the custom.

Parkersburg Belt Line.—The city of Parkersburg, W. Va., is making strenuous efforts to get a belt line to connect with the Ohio River Railroad, the Baltimore & Ohio and the Little Kanawha Valley road which is in prospect, to form a belt round the outskirts of the town, reaching the various manufacturing establishments. Within the past month two or three delegations of capitalists, whom the Parkersburg people have succeeded in interesting in the scheme enough to look the over ground, have visited Parkersburg to study the situation. The preliminary plans contemplate about five miles of road along the north side of the Kanawha River, with a bridge across that stream, east of the Ohio River Railroad Co.'s bridge, and about two miles of track on the south side of the river.

Plymouth & Middleboro.—All arrangements have been completed for building this road between Plymouth and Middleboro, Mass., and the contract will be given out within a week. The work will be begun immediately. The road will be 15 miles long and there will be no grade crossings, necessitating the erection of nine overhead bridges. It is expected that the road bed will be graded and ready for the rails by July. When completed the Old Colony will furnish the rolling stock and operate the road.

Port Angeles & Southern.—The surveys on this road have been about completed, and the engineers will soon prepare the estimates and profiles. The line will be 32 miles long from Port Angeles to the junction with the Port Townsend Southern road. The grades are all easy, except at the Morse Creek crossing. Here a two per cent. grade will be required. The road will be a very easy one to build, and can be finished in six months after work is begun. During the rainy season very little grading can be done, but work may begin on clearing the right of way.

Ravenswood, Spencer & Glenville.—The tracklaying on this line is completed from Ravenswood to Spencer, W. Va., a distance of 33 miles. Trains have been running for some time between Ravenswood and Le Roy, a distance of 17 miles. It is expected that the remainder of the line to Glenville will be completed by Jan. 1 and that through trains from Ravenswood to Spencer will be put on by that time. Arrangements have not been made yet for continuing the line to Glenville, though the company will make every effort to get at the work next spring or summer. The road so far as built is very well constructed. The roadbed is substan-

tial and ballasted with stone. The bridges are all of steel and the timbering is all hard wood and well driven.

Red River & Southwestern.—A mortgage has been given to the Union Trust Co. of New York on the 30 miles of road between Henrietta and Archer, Tex. The road has been graded from a connection with the Missouri, Kansas & Texas southwest to Archer, and it is proposed to complete the line and prepare it for operation with the funds secured by the issue of these bonds.

Rio Grande Southern.—The last track on this road between Rico and Durango, Col., was laid Dec. 19. This completes the main line from Ridgway in Ouray County, south of Dallas, on the Denver & Rio Grande, and Durango on the Silverton line of the same road. The new line is 171 miles long, following a very irregular route, and extending in a tortuous way through the San Miguel and Dolores mountains, following for the greater part of the distance Leopold Creek and the San Miguel and Dolores rivers. The distance in a straight line between the terminal points is about 70 miles. The line was opened recently for traffic as far south as Rico, 75 miles from the northern terminus, but the track had been laid in the previous year to Ilum and Telluride as well as for a few miles near Durango.

Roanoke, Fincastle & Clifton Forge.—This company recently chartered in Virginia has purchased the railroad of the Fincastle & Southern Botetourt Development Co. from Fincastle south to Cloverdale, Va., and has let the contract to the Roanoke & Botetourt Construction Co. for completing the road between Roanoke and Clifton Forge, 35 miles.

Roanoke & Southern.—The last rail on the line between Roanoke and Martinsville, Va., was laid Dec. 19, completing the road from Roanoke to Winston, N. C., a distance of 121 miles. The southern division of the road from Winston north to Martinsville was completed in 1890 and has been operated the entire distance since the early part of this year. The division north of Martinsville to Roanoke is 64 miles long, on which 40 miles of track was laid in the first half of the year.

Roxborough.—Now that the Common Council of Philadelphia has authorized the company to construct its line through the northern part of the city, and the plans have been approved for the grade crossings, it is expected that the contract will soon be let for building the road. It will be operated by the Pennsylvania, and will extend from Cheltenham Avenue Station, on the Chestnut Hill branch of the Pennsylvania, westward through the Twenty-first and Twenty-second wards in Philadelphia to Barren Hill in Montgomery County, thence directly through a level country for three miles to Corson's Station on the Trenton cut-off, a distance altogether of nearly ten miles. A large number of bridges will be erected along the line, as detailed in another column. A large majority of the stock of the new railroad is owned by directors and other stockholders of the Pennsylvania Road and large holders of land along the route surveyed. On account of the broken country through which the new line will run and the great number of bridges to be built, it is not likely that it will be ready for operation until late next year.

South Carolina Roads.—Bills have been introduced in the legislature to incorporate the following companies: Augusta, Aiken & Southern; Eutawville & Summerville; Florida, Georgia & Carolina; and the Walterboro, Summerville & Otranto.

Southern Pacific.—Press dispatches announce that the company has sold to C. H. & J. G. Pierce, a lumber firm of Chicago, 12,500 acres of timber land in Southern Oregon for \$100,000. A railroad is proposed from the Oregon & California road northeast about 45 or 50 miles through the timber lands to near Klamath City, Or., where the mills are to be located.

Work will probably be commenced early in the year on the gap on the Pacific Coast line between Santa Margarita and Elwood, Cal. The Pacific Improvement Co. has asked for proposals for bids for the construction of two tunnels, one 3,000 ft. and the other 1,400 ft. long, on the first four miles of the road, south of Santa Margarita. Bids for the remaining 125 miles of the line from Santa Margarita to Elwood will be called for hereafter.

Springfield, Yellville & White River.—The charter of this company was filed in Arkansas last week. The road is to extend from the Arkansas line in Boone County, southeasterly through Boone, Stone, Marion, Baxter, Searey, Van Buren, Cleburne, White, Woodruff, St. Francis, Cross and Crittenden counties, to the Mississippi River, and will be about 225 miles in length.

Walterboro, Summerville & Otranto.—The company has applied to the South Carolina Legislature for a charter, with H. St. J. Card, R. A. Pringle, W. G. Whaley and others as incorporators. The road is to extend from Walterboro through Summerville to Otranto station. The capital stock is \$500,000.

West Florida & Northern.—The company has filed a charter in Florida to build a road in St. Andrews Bay, in Washington County, Fla., to the Alabama state line, Holmes County. Other lines are to be built east of Wenatchee in Calhoun County and from Apalachicola through St. Joseph to the Florida state line.

West Virginia Central & Pittsburgh.—The connection between this company's extension from Elkins to Belington, W. Va., and the Grafton & Greenbrier narrow gauge line was made last Friday. The construction train passed over the last bridge spanning the Tygart's Valley River on that day, and the tracklaying is finished. The surfacing and ballasting is progressing rapidly, and the extension will be ready for trains by Jan. 1, as was promised. The Belington extension is 17 miles long, extending westerly to Belington.

West Virginia & Pittsburgh.—The company has decided to make a number of important changes in the grades and curves of the line between Clarksburg and Weston in the spring. Near Fisher's Hill the grade will be lowered by making a 35-ft. cut, and four short curves will be straightened. On the Braxton division, between Weston and Roanoke, W. Va., seven bridges will be built to take the places of trestles, and at four points heavy curves will be straightened.

GENERAL RAILROAD NEWS.

Baltimore & Ohio.—The following is the statement of earnings and expenses for November, 1891, compared with November, 1890: Gross earnings, 1890, \$2,004,252; 1891, \$2,097,277; increase, \$93,025. Operating expenses, 1890, \$1,400,634; 1891, \$1,475,310; increase, \$74,676. Net earnings, 1890, \$603,598; 1891, \$621,961; increase, \$18,363. Earnings and expenses for the two months of the fiscal

year 1891-92 compared with the same months of the year before are as follows: Gross earnings, 1890, \$4,237,468; 1891, \$4,401,068; increase, \$163,600. Operating expenses, 1890, \$2,887,153; 1891, \$3,122,110; increase, \$234,957. Net earnings, 1890, \$1,350,315; 1891, \$1,278,958; decrease, \$71,357.

Calgary & Edmonton.—The proposed lease of this road, which now has an operated mileage of 190 miles in Alberta, to the Canadian Pacific is reported to have fallen through, owing to the inability to secure the consent or proxy of the necessary majority of the bondholders. Several meetings of the stockholders and directors of the latter company have been called to act on the proposition and adjourned from time to time. It was proposed that the Canadian Pacific lease the line for six years, with the option of purchasing the property at the expiration of the lease. At a special meeting of the Canadian Pacific stockholders last week it was voted that the project be abandoned, the bonds of the new road being so widely scattered that a sufficient number of proxies had not then been secured.

Cincinnati Southern.—The injunction suit brought by the city of Cincinnati, which has prevented the arbitrators appointed by the lessee and the trustees in the suit over the Cincinnati terminals from acting, has been dissolved and the ratification of the appointment of the arbitrators, Hon. Grover Cleveland and Clarence A. Seward, will soon be effected. The controversy over the terminals has arisen out of the claim made by the lessees of the Cincinnati Southern that the trustees have not carried out that part of the lease which provided that adequate terminal facilities would be provided by the city of Cincinnati in that city for the business of the road. Subsequently a suit was brought against the city for the alleged failure to comply with the lease in this respect.

Cleveland, Lorain & Wheeling.—The passenger trains of this company will run into Cleveland over the tracks of the Lake Shore & Michigan Southern from Elyria, O., after Dec. 28. Notice to this effect has been given to the officers of the Cleveland, Cincinnati, Chicago & St. Louis, whose tracks are at present used by this company into Cleveland. General Manager Townsend says: "The Lake Shore owns quite a large block of the company's stock, and the plan soon to be adopted seems, on the whole, the most natural. The run by way of Elyria is only eight miles farther, and will make no real difference in the time of the trains."

Houston & Shreveport.—At a recent meeting of the directors of the Shreveport & Houston railway, held in New York, it was decided to change the name of the road to the "Houston & Shreveport Railway."

Houston & Texas Central.—Suit has been filed in the United States Circuit Court at Galveston, Tex., by the Morgan's Louisiana & Texas Railroad & Steamship Co. against this and company for the recovery of \$1,343,538. This sum is alleged to have been loaned for the purpose of paying debts and for betterments. The plaintiff's petition asks for an accounting, and that the claim be adjudged a lien on the defendant's property and assets prior to bondholders' claims.

Louisville, Evansville & St. Louis Consolidated.—At a special meeting which was held at Belleville, Ill., on Dec. 20, the stockholders voted to authorize the directors to conclude the purchase of the property of the Kentucky & Indiana Bridge Co., which owns the bridge over the Ohio River between New Albany and Louisville and about 10 miles of track, upon the terms agreed upon between the directors of the two corporations early in the year. A resolution to increase the capital stock for the purpose of purchasing the new stock was voted down, as was also the first resolution submitted by the directors for leasing the property.

Macon & Atlantic.—W. B. Sparks, of Macon, Ga., has again been appointed Receiver, on his own petition. Mr. Sparks was discharged as Receiver when it was announced that all claims would be satisfied and the road completed by a new subscription on the part of the bondholders of the Macon Construction Co. and the Macon & Atlantic, who would advance money enough to pay off the debts of the former and complete the railroad. Part of the debts were paid and some work done, but the effort to secure a sufficient amount of funds to carry out the arrangement was unsuccessful.

Marietta & North Georgia.—The receiver has recently been granted authority in the United States Court at Atlanta to issue receiver's certificates to the amount of \$1,000,000. This petition was made soon after the appointment of a receiver and was referred to a referee, who reported in favor of the issue of \$1,300,000 of certificates for improving the condition of the road, building a bridge over the Tennessee River at Knoxville, and making other improvements as already described in these columns.

Montreal & Sorel.—This road has been reopened between Armstrong and St. Lambert, Que., 44 miles. The road is operated by Mr. Bauchemin, of Sorel, Que., under the supervision of the new sequestrator, A. A. Taillon. The road was leased in 1885 to the Great Eastern, which has failed to carry out the terms of the lease.

Oregon Pacific.—By consent of all the parties to the foreclosure proceedings, the sale of the road has been postponed until Jan. 20, when it will take place at Corvallis, Or. The employees have received this month wages which have been unpaid three and a half months.

Paris, Marshall & Sabine Pass.—Receiver J. W. Harle, has applied to the State District Court at Marshall, Tex., for an order allowing the suspension of the operation of this road, which extends from Marshall north for 16 miles to Montvale. The reason he assigns for this action is that the division of freight rates fixed by the Texas & Pacific road and approved by the State Railroad Commission will render it impossible for the road to earn fixed charges.

Philadelphia & Reading.—The separate answer of the railroad company to the suit of John Lornie, Alfred Sully and N. B. Randall, brought to compel the payment of interest on Reading's third preference income bonds, was filed in the United States Circuit Court at Philadelphia Dec. 17. It denies that the Board of Managers of the Reading have diverted moneys from the lien of the mortgages or misapplied funds from the income account to the capital account.

Pittsburgh, Cincinnati, Chicago & St. Louis.—The statement of the business of the company, including the Little Miami road, for November, 1890, as compared with the same month in 1890, shows a decrease in gross earnings of \$35,861, and in expenses of \$41,479, and an increase in net earnings of \$5,618. The eleven months of 1891, as compared with the same period of 1890, show a decrease in gross earnings of \$695,697, in expenses of \$800,081, and in net earnings of \$5,615.

Savannah, Americus & Montgomery.—The company has recorded at Montgomery, Ala., and in other counties in Alabama and Georgia, a mortgage to the Mercantile Trust & Deposit Co., of Baltimore, as security for the issuance of \$6,150,000 of bonds for the construction and extension of the road.

Union Pacific.—The earnings of the entire system for October and for the 10 months of the year to Nov. 1 are as follows:

TOTAL UNION PACIFIC SYSTEM.				
Month of October:	1891.	1890.	Inc. or dec.	
Gross earnings.....	\$4,711,623	\$4,436,021	I.	\$275,602
Oper. expenses.....	2,707,842	2,937,344	D.	229,502
Net earnings.....	\$2,003,781	\$1,498,677	I.	\$505,104
Jan. 1 to Nov. 1:				
Gross earnings.....	\$35,877,021	\$37,139,607	D.	\$1,262,586
Oper. expenses.....	23,535,229	24,949,909	D.	1,291,680
Net earnings.....	\$12,341,792	\$12,239,698	I.	\$102,094

The earnings of some of the subdivisions are given below:

UNION PACIFIC SYSTEM.				
Month of October:	1891.	1890.	Inc. or dec.	
Mileage.....	7,688	7,586	I.	102
Gross earnings.....	\$4,578,245	\$4,306,892	I.	\$271,353
Oper. expenses.....	2,619,443	2,824,997	D.	205,554
Net earnings.....	\$1,958,802	\$1,482,595	I.	\$476,207
Jan. 1 to Nov. 1:				
Gross earnings.....	\$34,887,655	\$35,859,783	D.	\$972,128
Oper. expenses.....	22,712,819	23,840,488	D.	1,127,669
Net earnings.....	\$12,174,836	\$12,019,295	I.	\$155,541

OREGON SHORT LINE & UTAH NORTHERN.				
Month of October:	1891.	1890.	Inc. or dec.	
Mileage.....	1,422	1,422		
Gross earnings.....	\$681,735	\$701,519	D.	\$19,784
Oper. expenses.....	397,796	444,196	D.	46,400
Net earnings.....	\$283,939	\$257,323	I.	\$26,616
Jan. 1 to Nov. 1:				
Gross earnings.....	\$6,306,637	\$6,210,213	I.	\$96,424
Oper. expenses.....	3,869,637	4,034,598	D.	264,961
Net earnings.....	\$2,437,000	\$2,175,615	I.	\$261,385

UNION PACIFIC, DENVER & GULF.				
Month of October:	1891.	1890.	Inc. or dec.	
Mileage.....	1,452	1,401	I.	51
Gross earnings.....	\$600,730	\$575,984	I.	\$24,746
Oper. expenses.....	406,957	402,769	I.	4,188
Net earnings.....	\$193,773	\$173,215	I.	\$20,558
Jan. 1 to Nov. 1:				
Gross earnings.....	\$4,732,036	\$4,775,432	D.	\$43,396
Oper. expenses.....	3,558,287	3,264,770	I.	293,517
Net earnings.....	\$1,173,749	\$1,510,662	D.	\$336,913

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Dec. 22, 1891.

A meeting of General Live Stock Agents here last week resolved that from Jan. 1 the issue of all free transportation be abolished, except that provided for in the classification and tariffs; that is, only the number of train attendants necessary to look after the live stock in transit. Most, if not all, the agents present at the meeting were empowered by the companies they represented to take this action, and its approval by the Traffic Manager is therefore probable. The agents formed an organization to be known as the Live Stock Agents' Association, and elected O. H. Brown, of the Atchison, Topeka & Santa Fe, President, and H. G. Krake, of the Missouri Pacific, Secretary and Treasurer. It is said that there have been widespread abuses in the stock pass business, many improper passes being issued ostensibly on account of stock shipments.

The passenger rate war between Chicago and Kansas City is averted. All that the Alton demanded was that the tickets sold at short line rates from Kansas City to Cincinnati via Chicago should be limited to continuous passage, in order to keep the coupons out of the hands of the scalpers; and this demand has been complied with by the other roads.

The roads in the Chicago and Ohio River Association have resolved not to follow the example of eastbound lines in absorption of switching and cartage charges.

The decision of the Western roads to let their loaded cars go east has made a considerable change in the situation, and eastbound shipments last week were enormous, exceeding the record of the previous week by over 20,000 tons. Last week's tonnage was 120,361 tons, against 98,949 tons for the corresponding week last year. Grain shipments alone last week amounted to 68,842 tons. The Pittsburgh, Fort Wayne & Chicago carried 21,117 tons. The Chicago & Grand Trunk, which had led for several weeks, took only 13,915 tons. Of the freight through to the seaboard the Fort Wayne took 22 per cent., Michigan Central 21, Chicago & Grand Trunk 18, Lake Shore & Michigan Southern 15, New York, Chicago & St. Louis 9, P., C., C. & St. L. 8, and Baltimore & Ohio 6.

In the matter of the application of the Chicago, Burlington & Quincy for authority to apply to Beardstown, Ill., Mississippi River rates on grain destined to the east, Chairman Walker, of the Western Traffic Association, has issued the following decision of the Commissioners: "It is claimed that if grain is delivered to the Ohio & Mississippi at Beardstown instead of at East St. Louis, a saving in the expense of operation is thereby secured. The Commissioners, after due consideration, do not feel at liberty to comply with the request as made, because to do so would carry the Mississippi River rate into territory which at present is subject to Peoria rates; the preservation of the territorial adjustment as now existing is believed to be more important both to the Burlington and to other interests than the reduction in service that might take place were the request complied with. Under the existing arrangements with Eastern lines, including the Ohio & Mississippi, business delivered at Beardstown destined to the east when from points west of the Mississippi River is subject at Beardstown to the charge accruing to the Mississippi River plus the established percentage proportion of the Mississippi River rate to the East; and it is not apparent to the Commissioners that any good reason exists why this arrangement should be abandoned and the Western line forego its proportion, Mississippi River to Beardstown, of the rate from the Mississippi River to the seaboard."

Traffic Notes.

The \$2 extra fare that has been charged passengers on the vestibule limited train of the Richmond & Danville between Washington and Atlanta is now abolished.

The United States Grand Jury at Concord, N. H., found no indictment against the Boston & Maine or any

of its officers for issuing free passes in violation of the Interstate Commerce law.

The rates for season tickets on the Baltimore & Ohio Southwestern are to be revised on Jan. 1, and annual tickets will be sold for about 15 per cent. less than the price charged for the same number of rides when tickets are bought monthly.

The Pullman sleeping car which is to run between New York and San Francisco weekly, via the Pennsylvania lines, will make its first trip from Jersey City, Jan. 4. The announcement does not say what route the car will take west of Chicago.

The Interstate Commerce Commission.

The Commission, in an opinion by Commissioner Morrison, has announced its decision of the case of Lehmann, Higginson & Co., of Humboldt, Kan., against the Texas & Pacific and Missouri, Kansas & Texas in favor of complainants. The points decided are briefly as follows:

Several roads forming a continuous through line carried sugar to Kansas City, the terminal point, at a 30-cent rate, and for the same rate to Parsons, Kan., an intermediate point, and to Humboldt, a point on a branch line more distant than the intermediate, but less distant than the terminal point, at 42 cents; it is held that the roads might lawfully maintain the same rate at the intermediate and terminal points, and some higher rate might be maintained to the branch line point, off the direct through line, without unjust discrimination; it is also held that as to the branch line point the complainant was entitled to a refund of the amount paid in excess of a reasonable rate. The Commission orders that the rate to Humboldt should not exceed 36 cents per 100 lbs.

A joint tariff must show on its face what carriers unite in establishing it. The publication and filing of a schedule of rates by the New Orleans Traffic Association, and a supplemental rate sheet by the Texas & Pacific Railway Co., a member of that association, did not establish, as provided by Section 6 of the act to Regulate Commerce, a joint tariff of rates on a continuous line, from New Orleans to Kansas City, over the roads of said association, or of any one of them, in connection with any other road or roads. Where freight passes over a continuous line or route, operated by more than one company, on which no joint tariff of rates has been established, the tariff is the sum of the established local rates.

Tariffs That Do Not Conform to the Law.

The prosecution by the Interstate Commerce Commission of J. C. Rogers, agent of the Nickel Plate line, and T. J. Keyer, a shipper, for underbidding cotton from Memphis, Tenn., to Lowell, Mass., fell through when tried at Memphis last week.

Judge Hammond, who presided at the trial, explained the case to a reporter of the *Appeal-Avalanche* as follows:

"The defense got in their work on the question of what is meant by 'established rates' that cannot be violated without criminal penalties. I infer that the prosecution did not go to pieces so much from the ruling of the court as from a discovery of the fact that the railroads involved had not been closely looked after and compelled to comply with the Interstate Commerce act in this matter of establishing and publishing rates. Looseness of administration by the railroads in carrying on the transportation business may not be fatal to a fairly reasonable compliance with the law in its relation to the executive duties of the Interstate Commerce Commission, but when it comes to enforcing the criminal penalty the strictness of the criminal law and its methods of procedure require more careful scrutiny into railroad methods, and the lawyers who defended this case will drive the traditional coach and four through a good deal of the work of joint committees and traffic associations, with their rate sheets, tariffs, and joint resolutions. Perhaps the railroads do not mind leaving loop holes for the escape of customers and agents, who bring grist to their mill."

"The defense wanted to show that the Nickel Plate line was exempt from the Interstate Commerce act, because there was no continuous line under a single management or control, but only an agent shipping cotton, as any other shipper might do, by any convenient route, which, in this case, was the Mississippi River, to a carrier at the Ohio River, there to deliver it to the initial road of the combination. But the case never reached that point, and there was no ruling on it."

"The government produced a rate sheet, filed by the joint committee of the Central Traffic and Trunk Line Associations, and asked to put it before the jury as the 'established rate' of the Nickel Plate line, which had been violated. The defense objected. The prosecution offered to prove that the railroads over which Keyer's cotton was shipped east of the Ohio River were a part of that combination and had agreed to these rates, thereby making them the 'established rate' which it was unlawful for Keyer to violate. The names of the railroads were not mentioned in the rate sheet, nor in the joint resolution filed with the Commission, but it was offered to prove by the testimony of the Secretary of the joint committee that these railroads belonged to the combination and were bound by its action. He was asked if the agreement was in writing, and replied that it was. The prosecution took time to get the documents, and on inspection of them surrendered the case, and there was a verdict of not guilty. Whether this was because the railroad companies were not bound by the rate sheet, as shown by the agreement, or because there was no proof at hand to convict them with, I do not know. There was no attempt to prove that the Nickel Plate line had established rates of its own by agreeing to them, or by acting on them independently of these traffic associations, but certainly it is to be inferred that the Nickel Plate line had never been compelled under the Interstate Commerce act to establish and publish its rates as a carrier or freight line independently engaged in the transportation business, partly by rail and partly by water, and to file its rates with the Commission. If this had been done those rates would have been produced. In making the ruling the court analyzed the act closely and pointed out the wide distinction it contains between establishing rates by the carrier and filing the contracts, agreements or arrangements and the schedule of the established rates with the Interstate Commerce Commission."

"I think I may properly suggest that the Interstate Commerce act needs amendment to be conveniently efficient. All contracts for a combination of carriers, or by others (fast freight lines) having engagements as freighters with carriers for continuous transportation, should be required to be in writing, the writing to be filed with the Interstate Commerce Commission, and no combination to be lawful, unless so made; the mode of establishing the rates to be regulated by the articles of agreement, then there would be no such trouble as there was in this case."

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